

Codevelopment in Personality:

The Interplay between Big Five Traits, Self-Esteem, and Satisfaction in Couples and Families

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Rebekka Weidmann

from Ramlinsburg, BL

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Approved by the Department of Psychology

at the request of

Prof. Dr. Sakari Lemola (Chair)

Prof. Dr. Alexander Grob (Referee)

Prof. Dr. Ulrich Orth (Co-Referee)

Basel, _____

Prof. Dr. Roselind Lieb

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TABLE OF CONTENTS

1	Introduction	7
2	Theoretical Background	10
2.1	Big Five Traits	10
2.1.1	Big Five traits and satisfaction in couples.	10
2.1.2	The Actor–Partner Interdependence Model.	11
2.1.3	Big Five trait similarity and satisfaction in couples.	12
2.1.4	Person-relationship transactions for Big Five traits.	13
2.2	Beyond Traits: Self-Esteem as Personality Characteristic	15
2.2.1	Self-esteem and satisfaction in couples.	15
2.2.2	Self-esteem, perceptual processes, and satisfaction in couples.	16
2.2.3	Self-esteem similarity and satisfaction in couples.	17
2.2.4	Person-relationship transactions for self-esteem.	19
2.3	Big Five traits and Self-Esteem	19
2.3.1	Codevelopment in Big Five traits and self-esteem.	21
3	Research Questions	23
4	Method	25
4.1	Samples	25
4.2	Instruments	27
4.3	Analytical Strategy	31
5	Synopsis of Results	34
5.1	Big Five Traits, Self-Esteem, and Satisfaction in Couples	34
5.1.1	Big Five traits.	34
5.1.2	Self-esteem.	35
5.1.3	Personality similarity predicting satisfaction in couples.	35
5.1.4	Self-esteem as mediator between Big Five traits and satisfaction in couples.	36

5.1.5	Perceptual processes as mediators between self-esteem/neuroticism and satisfaction in couples.	36
5.1.6	Satisfaction in couples predicting Big Five traits and self-esteem.	37
5.2	Association between Big Five Traits and Self-Esteem	37
5.2.1	Big Five traits predicting self-esteem.	37
5.2.2	Self-esteem predicting later Big Five traits.	38
5.2.3	Family members' impact on Big Five traits and self-esteem.	38
6	General Discussion	40
6.1	Big Five traits and Satisfaction in Couples	41
6.2	Self-Esteem and Satisfaction in Couples	43
6.3	Satisfaction in Couples as a Predictor of Big Five Traits and Self-Esteem	46
6.4	Reciprocity between Big Five Traits and Self-Esteem	47
6.5	Familial Impact on Big Five Traits and Self-Esteem	48
6.6	Strengths and Limitations	49
6.7	Conclusion and Outlook	51
7	References	55
	APPENDIX A: Article 1	74
	APPENDIX B: Article 2	109
	APPENDIX C: Article 3	161
	APPENDIX D: Article 4	206
	APPENDIX E: Article 5	238
	APPENDIX F: Selbständigkeitserklärung	311
	APPENDIX E: Curriculum Vitae	312

Abstract

Big Five traits and self-esteem play a crucial role in explaining satisfaction in couples. Moreover, no clear answer exists whether similarity in Big Five traits and self-esteem predict couple satisfaction. Further, little evidence exists showing whether relationship satisfaction predicts Big Five traits and self-esteem. These personality constructs have rarely been studied conjointly and no research is available to give some indication of how family members impact each other in Big Five traits and self-esteem (i.e., codevelopment in personality). This cumulative dissertation encloses five studies with the goal to review current research on Big Five traits and satisfaction in couples, to test whether Big Five traits, self-esteem, and the partners' similarity in personality predict relationship satisfaction and whether relationships satisfaction predicts later personality. We further examine self-esteem as mediator between Big Five traits and relationship satisfaction and perceptual processes as mediators between self-esteem, neuroticism, and relationship satisfaction. We also study Big Five traits and self-esteem conjointly to test for their reciprocal association and their possible impact on family members' personalities. The five studies reveal that (a) neuroticism, agreeableness, conscientiousness, and self-esteem are especially vital for both partners' satisfaction, (b) Big Five trait and self-esteem similarity does not substantially contribute to satisfaction in addition to both partners' personality main effects, with the exception of neuroticism and openness, (c) self-esteem and perceptual processes emerged as mediators, (d) Big Five traits and self-esteem are associated concurrently and have a bidirectional impact on each other longitudinally, and (e) evidence from studies with adolescent and young adult children suggests little impact of family members' personalities on their Big Five traits and self-esteem. The present dissertation highlights the importance of the conjoint examination of Big Five traits and self-esteem and their reciprocity over time. Finally, the analysis of the impact of family members' personality traits and self-esteem suggests new research avenues when studying Big Five traits and self-esteem development.

1 Introduction

„Man's main task in life is to give birth to himself, to become what he potentially is. The most important product of his effort is his own personality.“ Erich Fromm, 1947

Personality has been a promising research topic since the 1930s (McAdams, 1997). Defined as “the sum of characteristics that reflect relatively enduring patterns of emotion, cognition, motivation, and behavior in which one individual differs from others” (Kandler, Zimmermann, & McAdams, 2014, p. 231), personality has often been conceptualized by the Big Five trait model (John & Srivastava, 1999). However, aside from the Big Five traits reflecting dispositional traits, self-esteem as characteristic adaptation also reflects a very prominently studied personality characteristic (Donnellan, Trzesniewski, & Robins, 2011). Both Big Five traits as well as self-esteem substantially contribute to social relationships (e.g., Asendorpf & Wilpers, 1998; Erol & Orth, 2013; Mund & Neyer, 2014).

One of the most important social context that individuals engage in is a romantic relationship. Such relationships are closely tied to an individual's well-being, which is associated with relationship satisfaction (Dush & Amato, 2005). Evidence suggests that Big Five traits and self-esteem predict relationship satisfaction (Jones & Cunningham, 1996; Karney & Bradbury, 1995). However, it is crucial to investigate both partners' information to take into account their interdependence (Kenny & Cook, 1999; Kenny, Kashy, & Cook, 2006). This is best accomplished when employing the Actor–Partner Interdependence Model (Kenny et al., 2006). To date, no review article summarizes the dyadic findings of Big Five traits on relationship satisfaction. Further, evidence on the role of similarity in partners' Big Five traits and self-esteem for their satisfaction yielded inconclusive findings in the past, especially for Big Five traits (Barelds & Dijkstra, 2007; Gattis, Berns, Simpson, & Christensen, 2004). Furthermore, according to a person–environment transactionist view (Neyer, Mund, Zimmermann, & Wrzus, 2014), personality not only predicts outcomes in romantic relationships but these in turn might also predict personality (Mund & Neyer, 2014;

Neyer & Lehnart, 2007; Robins, Caspi, & Moffitt, 2002). Such relationship effects on personality have been coined “codevelopment in personality” in past research (Neyer & Asendorpf, 2001, p. 1190). It is therefore crucial to further illuminate the bi-directionality of personality and romantic relationships.

Moreover, Big Five traits and self-esteem have usually been studied separately from each other. However, merging research on Big Five traits and self-esteem may create the opportunity to link self-esteem to the same important life outcomes as the Big Five traits and might even point to possible explanatory mechanisms (Robins, Tracy, Trzesniewski, Potter, & Gosling, 2001). Due to their interconnectedness (Amirazodi & Amirazodi, 2011; Robins, Tracy, et al., 2001), the independent contribution of Big Five traits and self-esteem to important life outcomes needs to be disentangled. In addition, to the best of our knowledge, a possible reciprocal association has not yet been examined, leaving the hypothesis untested of whether Big Five traits and self-esteem impact each other’s development over time. Since family relationships are an essential socialization context (Bronfenbrenner, 1986) the impact of family members on the individual’s personality development needs to be examined.

The present dissertation aims to extend current research by integrating the study of Big Five traits and self-esteem within close relationships including romantic relationships and families. Thereby, we will employ a dyadic approach to the associations and similarity effects of Big Five traits and self-esteem on satisfaction in romantic couples (Articles 1, 2, 3, and 4). Further, we will conjointly investigate Big Five traits and self-esteem to determine their distinct impact (Article 3) and mediating mechanisms (Article 4) in romantic relationships. The present dissertation takes a closer look at person-relationship transactions and the reciprocity between personality and relationship satisfaction (Articles 3 and 4). Finally, we will investigate the reciprocal link between Big Five traits and self-esteem in families to provide a clearer picture of the interplay between these constructs and describe how family members’ Big Five traits and self-esteem impact a person’s own development (Article 5).

The following chapter describes the theoretical background on Big Five traits, self-esteem, and their association with satisfaction in couples. Further, the theoretical underpinnings of the association between Big Five traits and self-esteem will be explained as well as the possible impact of family members on their development. In Chapter 3 the research questions are presented. Chapter 4 explains the methods including the sampling, instruments, and analytic strategies of the studies. Chapter 5 gives a synopsis of the results. These results will be discussed in Chapter 6 with regard to their theoretical background, scientific contribution, theoretical and implications, and outlook for future research.

2 Theoretical Background

2.1 Big Five Traits

The Big Five traits originated a long history in the quest of finding a comprised model of factors that best represented an individual's personality (Digman, 1990). Representing one of the most widely used taxonomies to assess basic tendencies of personality (John, Naumann, & Soto, 2008), the Big Five traits include five dimensions comprising the traits of neuroticism, agreeableness, conscientiousness, extraversion, and openness to experience (John & Srivastava, 1999). Neuroticism reflects individuals' tendencies to be worried, tense, and anxious. Agreeableness subsumes characteristics such as being trusting, generous, and appreciative. Conscientiousness describes the extent to which individuals are able to be dutiful, reliable, and organized. Extraversion includes being outgoing, talkative, and assertive. Finally, openness to experience reflects curiosity, imagination, and originality (McCrae & John, 1992).

2.1.1 Big Five traits and satisfaction in couples. A vast number of authors have devoted their research to the association between Big Five traits and relationship outcomes (Cooper & Sheldon, 2002). For example, Karney and Bradbury (1995) meta-analyzed longitudinal studies on marital satisfaction and stability and proposed the Vulnerability-Stress-Adaptation (VSA) model of Marriage, postulating that the interplay between enduring vulnerabilities, stressful events, and adaptive processes predict relationship quality and stability. Personality traits can act as enduring vulnerabilities that hinder romantic partners to adapt to stress successfully, or personality traits per se create stressful events within the relationship that both partners need to cope with. The longitudinal results reviewed in the article by Karney and Bradbury (1995) demonstrate that for wives and husbands, agreeableness, conscientiousness, and extraversion were positively associated with relationship satisfaction, whereas neuroticism and openness predicted marital satisfaction negatively. Hence, in line with the VSA model (Karney & Bradbury, 1995), neuroticism and

openness seem to represent enduring vulnerabilities, whereas agreeableness, conscientiousness, and extraversion encompass enduring assets or strengths in adapting to stressful events within romantic relationships.

2.1.2 The Actor–Partner Interdependence Model. The majority of studies analyzing effects of personality on relationship satisfaction have investigated individuals rather than the couple (e.g., Heller, Watson, & Ilies, 2004). However, researchers have suggested that within interdependent relationships, such as romantic couple dyads, it is crucial to take into account the interdependence of both partners (Kenny & Cook, 1999; Kenny et al., 2006). The Actor–Partner Interdependence Model (APIM) reflects an appropriate tool to examine dyadic data and to compute intra- and interpersonal effects called actor and partner effects. Figure 1 displays a simple APIM illustrated for a heterosexual couple with both partners’ personality as predictor variables and both partners’ satisfaction as outcomes. Paths a represent actor effects, whereas paths b reflect partner effects.

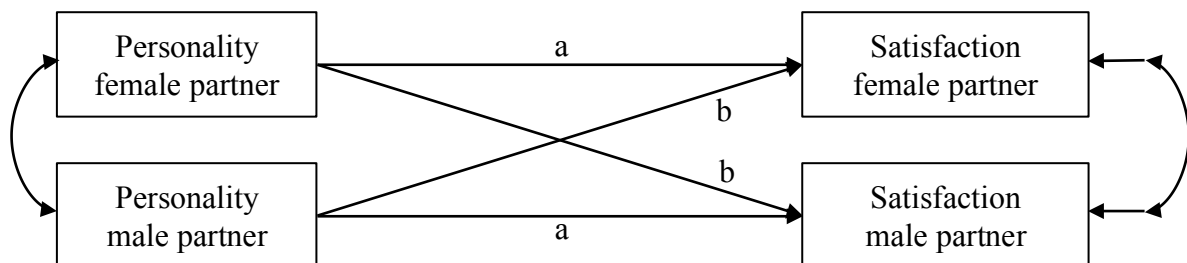


Figure 1. Actor–Partner Interdependence Model

Following the publication of the APIM, an increasing number of studies emerged that examined the dyadic effects of personality traits on satisfaction in couples (e.g., Dyrenforth, Kashy, Donnellan, & Lucas, 2010; Solomon & Jackson, 2014). However, this literature has not yet been reviewed in a systematic way to summarize the current evidence on actor and partner effects for Big Five traits and satisfaction in couples. In Article 1, we aim to close this

gap by providing a review on the dyadic effects on the self-, partner-, and meta-reported (i.e., how I think my partner sees me) Big Five traits on relationship and life satisfaction in romantic couples.

2.1.3 Big Five trait similarity and satisfaction in couples. In addition, some researchers have also studied the question of whether similarity between partners partly explains why some couples are satisfied with their relationship and others are not (Barelds & Dijkstra, 2007; Gattis et al., 2004; Gaunt, 2006; Luo & Klohnen, 2005; Nemechek & Olson, 1999). The similarity assumption has been widespread among the general population guided by popular sayings such as: “like attracts like”, “birds of a feather flock together”, and “opposites attract”. These sayings demonstrate that similarity and complementarity could be important in mate selection. A large body of research supports assortative mating (mating on the basis of similarity) with regard to socio-economic status, nationality, religiosity, political attitudes, age, and personality (Alford, Hatemi, Hibbing, Martin, & Eaves, 2011; Buss, 1985; Eaves & Hatemi, 2011).

Above and beyond mate selection, the question arises whether similarity in personality traits is also linked to satisfaction within ongoing relationships. Personality similarity could be linked to satisfaction in couples because it increases the comparability of both partners’ emotional perception and involvement in their relationship, which facilitates the coordination of both partners’ behavior and thinking (Anderson, Keltner, & John, 2003) leading to intimate feelings, validation, and understanding (Reis & Shaver, 1988). In addition, similarity might decrease the chances of conflict situations and eventually relationship dissolution (Rammstedt, Spinath, Richter, & Schupp, 2013).

Evidence for similarity effects, however, has been mixed. While some studies show no such prediction (Barelds & Dijkstra, 2007; Gattis et al., 2004), others reveal that similarity predicts satisfaction in couples (Decuyper, De Bolle, & De Fruyt, 2012; Gaunt, 2006; Karney & Bradbury, 1995; Nemechek & Olson, 1999), even above and beyond self-ratings of

romantic partners (Luo & Klohnen, 2005). The emergence of the APIM enabled researchers to test whether similarity plays a significant role for the satisfaction in couples above and beyond actor and partner effects, taking into account the interdependence in couple data. This growing research body on personality similarity in APIMs has not yet been reviewed, which reflects a second goal of Article 1.

Previous results on personality similarity differ depending on how similarity is operationalized (Luo et al., 2008). In the past, similarity has been operationalized with methods such as difference scores, profile correlations, and interaction terms. However, these measurement methods refer to different aspects of similarity and hence, do not test the same hypotheses. Further, these operationalizations of similarity follow the assumption of linearity (Nestler, Grimm, & Schönbrodt, 2015). However, recent evidence corroborates the notion that for some trait moderate similarity might yield a positive effect on satisfaction in couples (Hudson & Fraley, 2014). Moreover, these methods do not measure the best fit hypothesis, which encompasses whether a specific level of one partner's personality with a specific level of the other partner's personality would predict highest levels of satisfaction pertaining to the question of whether there is an optimal combination between partners yielding the best outcome. To reduce the confusion surrounding similarity's role in romantic couples, Article 2 investigates similarity above and beyond actor and partner effects with dyadic polynomial regression and response surface analyses to determine romantic partners' similarity and its role for the satisfaction in the couple. In contrast to previous methods, polynomial regression analyses and the resulting response surface analyses are better able to answer the similarity hypothesis (Edwards, 2002; Nestler et al., 2015).

2.1.4 Person-relationship transactions for Big Five traits. Personality research employing a life span perspective suggests that personality traits are stable constructs that also change across an individual's life, especially during adolescence and young adulthood (Roberts & DelVecchio, 2000; Roberts, Walton, & Viechtbauer, 2006). On average, people

tend to increase in emotional stability, conscientiousness, and agreeableness (Roberts et al., 2006; Specht, Egloff, & Schmukle, 2011) developing a more mature personality. Personality changes across the life span lead to the question of what factors are involved in shaping personality development. Two main theories have guided research on personality development. The five-factor theory (FFT) posits that personality maturation is a genetically driven process within which the environment plays a negligible role (Boyle, 2008; McCrae et al., 2000). In contrast, theoretical notions such as the social investment theory (Roberts, Wood, & Smith, 2005) and person-environment transactions (Caspi & Roberts, 2001; Magnusson, 1988) additionally attribute maturation processes to the environment, such as attaining social roles, experiencing life events, and mastering developmental tasks (Bleidorn et al., 2015; Hogan & Roberts, 2004; Hutteman, Hennecke, Orth, Reitz, & Specht, 2014). Recent research findings support the role of the environment in shaping personality development (e.g., Bleidorn et al., 2013; Specht et al., 2011).

Within the scope of close relationships, Neyer and Asendorpf (2001) coined the term “codevelopment in personality” (p. 1190), which emphasizes the developmental function of significant others in shaping an individual’s personality. Starting with the publication of Asendorpf and Wilpers (1998), research has tested the reciprocal assumptions of person-relationship transactions with regard to the individual’s personality and relationships. In particular, studies on personality and romantic relationships suggest that the personalities of romantic partners impact relationship quality and vice versa (Mund & Neyer, 2014; Neyer & Asendorpf, 2001; Robins et al., 2002). These results suggest that relationship quality is not only influenced by, but also influences, neuroticism, agreeableness, extraversion, and conscientiousness, where most consistent effects were found for neuroticism.

Past research has mainly focused on relationship quality as a proxy of the impact of relationships on personality (Mund & Neyer, 2014; Neyer & Asendorpf, 2001; Robins et al., 2002). In Article 4, we also test the relationship’s impact on personality by asking participants

about their relationship satisfaction. Previous studies on subjective well-being reveal that it predicts personality development (Soto, 2015; Specht, Egloff, & Schmukle, 2013) and therefore domain-specific satisfaction, such as with regard to one's romantic relationship, could also yield effects on later personality. In addition, partner effects of satisfaction on the personality would further illuminate how romantic relationships and the interdependence thereof impact personality.

2.2 Beyond Traits: Self-Esteem as Personality Characteristic

Self-esteem, defined as the subjective evaluation of one's own worth (Leary & Baumeister, 2000), represents a construct of large interest across diverse psychological research fields (Donnellan et al., 2011; Trzesniewski, Donnellan, & Robins, 2003). Whereas Big Five traits represent basic tendencies, self-esteem has been subsumed under characteristic adaptations in personality models such as the FFT (McCrae & Costa, 1999) and the New Big Five model (McAdams & Pals, 2006) representing more malleable and less strongly genetically influenced personality concepts (Anusic & Schimmack, 2016; Kandler et al., 2014).

2.2.1 Self-esteem and satisfaction in couples. In addition to the predictive validity of self-esteem on various outcomes concerning the individual such as well-being, depression, and job satisfaction (Orth, Robins, & Widaman, 2012), self-esteem has also been studied in the context of romantic relationships. The risk-regulation model constitutes the theoretical basis for the association of self-esteem and relationship satisfaction (Murray, Holmes, & Collins, 2006; Murray, Holmes, & Griffin, 2000). The model proposes that romantic partners with low self-esteem are unable to perceive the positive regard of their partner and therefore regulate their emotional closeness toward their partner more cautiously compared to individuals with high self-esteem. This caution originates from the lack of a feeling of security that the partner is available (Murray, 2005). Because persons with low self-esteem feel that their relationships are more risky, their perceptions of their partner are also more

negative (Murray, Holmes, & Griffin, 1996a), resulting in lower relationship satisfaction (Murray et al., 1996a).

Research corroborates the link between self-esteem and relationship satisfaction. In their review article, Erol and Orth (in press) present the evidence on actor and partner effects. Several studies suggest positive actor and partner effects between self-esteem and relationship satisfaction in couples (Erol & Orth, 2013; Murray et al., 2000; Robinson & Cameron, 2012). However, other studies did not find partner effects in cross-sectional (Jones & Cunningham, 1996; Tackett, Nelson, & Busby, 2013) or longitudinal studies (Schaffhuser, Wagner, Lüdtkke, & Allemand, 2014). In addition, only a few longitudinal studies exist attesting to the predictive validity of self-esteem for relationship outcomes (Fincham & Bradbury, 1993; Johnson & Galambos, 2014; Neyer & Asendorpf, 2001; Orth et al., 2012). Therefore, in Article 3, we will study the concurrent and longitudinal reciprocal dyadic association between self-esteem and relationship satisfaction to shed further light into the inconsistent findings of previous studies.

2.2.2 Self-esteem, perceptual processes, and satisfaction in couples. The risk-regulation framework by Murray et al. (2006) explains the link between self-esteem and satisfaction in couples with two different perceptual pathways. First, individuals with low self-esteem are less able to perceive their partner's positive regard of them. Research demonstrates that lower self-esteem is associated with reporting more negative perceived regard, explaining the link between self-esteem and relationship satisfaction (Murray et al., 2000). Second, low self-esteem impedes the ability of individuals to view their partner in a generous way (Murray et al., 1996a) and to overlook the flaws of the partner (Martz et al., 1998; Murray, Holmes, & Griffin, 1996b). The negative self-evaluation of individuals seems to be the guiding value system to also perceive other people in a more negative light (Murray et al., 1996a). These partner perceptions are in turn related to the general satisfaction with the relationship (Murray et al., 1996a). Hence, in Article 3, we investigate whether perceived

regard and perception of the partner mediate the concurrent and longitudinal associations between self-esteem and relationship satisfaction.

Perceptual processes within couples have not only been studied in the light of self-esteem, but also with regard to the Big Five trait neuroticism. Research shows that neuroticism is linked to perceptual and interpretational biases within the context of romantic relationships. More specifically, when imagining ambiguous situations with their partner, neurotic individuals tend to interpret these situations more negatively (Finn, Mitte, & Neyer, 2013). Further, neurotic individuals hold more negative expectations about a future interaction with their partner and more negatively perceive their partner's behavior within that interaction (McNulty, 2008). These negative perceptual processes could be explained by the anxious component of neuroticism, which is associated with negativity and biased perceptions (Caughlin, Huston, & Houts, 2000; Finn et al., 2013) and the tendency of neurotic individuals to harbor negative irrational thoughts (Costa & MacCrae, 1992). In addition, neuroticism and self-esteem can be subsumed under the construct of core self-evaluations, indicating that both serve similar functions (Judge, Erez, Bono, & Thoresen, 2002). It is therefore imperative to disentangle the prediction of self-esteem and neuroticism on perceptual processes and eventually on relationship satisfaction. To take into account the research on neuroticism, we examine the associations between self-esteem and relationship satisfaction as well as the proposed mediational function of perceptual processes while controlling for the associations of neuroticism (Article 3).

2.2.3 Self-esteem similarity and satisfaction in couples. No clear theoretical basis exists that explicitly states why self-esteem similarity might play a crucial role for satisfaction in couples. It has been suggested that partners who share a similar level of self-esteem might be able to empathize more strongly and thus experience more satisfying interactions (Erol & Orth, 2014). However, according to interpersonal theory, complementarity with regard to the dominance-submissiveness dimension might yield benefits for experiencing secure

interactions (Carson, 1969). Because self-esteem is connected to social dominance, complementary self-esteem levels might be more beneficial than similar levels. Finally, both beneficial and detrimental effects of similarity in self-esteem could cancel each other out, leading to no association between similarity and satisfaction in romantic partners (Erol & Orth, 2014).

Evidence for the role of self-esteem similarity effects in predicting relationship satisfaction is scarce. One study reveals significant interaction effects between both partners' self-esteem, showing that one partner's self-esteem is more strongly linked to relationship satisfaction if the other partner's self-esteem is high (Barelds, 2005). Two other studies found no such interaction or similarity effects (Arrànz Becker, 2013; Robinson & Cameron, 2012). Likewise, self-esteem similarity does not predict the development of relationship satisfaction over time (Erol & Orth, 2014). However, since different methodological strategies have been employed to measure similarity in these studies (interaction effects and difference scores), Article 2 investigates similarity effects in the self-esteem of both partners with dyadic polynomial regression analyses to determine whether similarity in both partners' self-esteem levels is associated with high levels of relationship satisfaction.

Even though not in the main scope of this dissertation, we also examine goal similarity to study motivational personality characteristics in the prediction of couple satisfaction (Article 2). Goals and motivations are essential in understanding satisfaction in couples (Fowers & Owenz, 2010) and their pursuit is most often an interdependent process taking place in the context of social relationships (Fitzsimons & vanDellen, 2015). On the one hand, we examine intrinsic goals, which include personal growth, relationships, community, and health. These goals fulfill the basic needs postulated in self-determination theory (Deci & Ryan, 2000), leading to increased well-being and therefore also satisfaction in couples (Arrànz Becker, 2013). On the other hand, we also study extrinsic goals encompassing wealth, fame, and image, which are expected to be unable to satisfy the basic needs of

autonomy, competence, and affiliation and will thus not contribute to well-being in the long-term (Sheldon & Kasser, 1998).

2.2.4 Person-relationship transactions for self-esteem. Longitudinal research suggests that self-esteem is a stable personality characteristic that increases during adolescence and young adulthood, peaking at around 50 to 60 years, from which sudden decreases are recorded (Erol & Orth, 2011; Orth, Trzesniewski, & Robins, 2010). Similar to the Big Five traits, the question arises on what factors are influential in the prediction of self-esteem development. The sociometer theory of Leary and Baumeister (2000) posits that self-esteem serves as a gauge or monitor that reflects whether an individual feels a part of important relationships. According to this theory, self-esteem increases or decreases as a function of social inclusion and would therefore, within the context of romantic relationships, be dependent upon the experienced relationship satisfaction. In contrast, the self-broadcasting theory (Srivastava & Beer, 2005) hypothesizes that higher self-esteem might foster social inclusion in others, assuming the opposite direction of causation such that self-esteem might elicit positive feelings in other people to like the individual because of his or her self-confident appearance.

Personality-relationship transactions within the scope of self-esteem have rarely been investigated. Little evidence exists showing that relationship satisfaction predicts later self-esteem (Fincham & Bradbury, 1993; Schaffhuser, Wagner, et al., 2014). Reciprocal positive effects between relationship quality and self-esteem were revealed in a recent study (Mund, Finn, Hagemeyer, Zimmermann, & Neyer, 2015). To extend current research, it is thus a further goal of Article 3 to test the reciprocal link of self-esteem and relationship satisfaction in couples, since these associations have rarely been tested.

2.3 Big Five traits and Self-Esteem

From the research of Big Five traits and self-esteem it becomes evident that they show certain similarities. First, these personality constructs predict similar outcome variables, such

as well-being, health, relationship, and work outcomes (e.g., Orth et al., 2012; Ozer & Benet-Martinez, 2006; Roberts, Kuncel, Shiner, Caspi, & Goldberg, 2007). Second, Big Five traits and self-esteem might share developmental origins (Robins, Tracy, et al., 2001). For instance, it has been found that entering a romantic relationship impacts personality development (Lehnart, Neyer, & Eccles, 2010; Luciano & Orth, 2016; Neyer & Lehnart, 2007). Finally, studying self-esteem could lead to a clearer understanding of what underlying processes explain the link between Big Five traits and outcomes (Robins, Tracy, et al., 2001). Since Big Five traits, self-esteem, and relationship satisfaction are associated (Erdle, Gosling, & Potter, 2009; Robins, Hendin, & Trzesniewski, 2001; Watson, Suls, & Haig, 2002), Article 4 tests whether self-esteem mediates the dyadic effects of Big Five traits on relationship satisfaction concurrently and longitudinally. It has been suggested that self-esteem mediates the associations between Big Five traits and adjustment (Graziano, JensenCampbell, & Finch, 1997), however, whether self-esteem mediates the link between Big Five traits and relationship satisfaction in couples has not yet been examined. In addition, and in line with the person-relationship transaction view, this study also examines whether, longitudinally, self-esteem mediates the association between relationship satisfaction and later Big Five traits.

In addition, the association between self-esteem and personality constructs, such as the Big Five traits, has always posed an enduring question in self-esteem research (Donnellan et al., 2011). Personality models hypothesize that Big Five traits and self-esteem may or may not impact each other in a reciprocal way (Kandler et al., 2014; McAdams & Pals, 2006; McCrae & Costa, 1999). On the one hand, the FFT proposes that broad dispositions such as the Big Five traits are mainly influenced by biological factors. In addition, surface characteristics such as self-esteem represent results, adaptations, or side products of Big Five traits (Kandler et al., 2014; McCrae & Costa, 1999). On the other hand, the New Big Five model of McAdams and Pals (2006) suggests a reciprocal association between broad dispositions and characteristic

adaptations such that characteristic adaptations have their unique developmental pathway and are not simply derivatives of broader dispositions (McAdams, 1995; McAdams & Olson, 2010). Self-esteem is hence not developed due to broad dispositions, but rather, influenced by the development in children to strive for goal achievement, which in turn, promotes self-esteem (McAdams, 2015).

Further, little evidence exists on the interrelatedness of personality levels, such as broad dispositions and surface characteristics (Dunlop, 2015; Wrzus & Roberts, 2016). Research on the concurrent link between Big Five traits and self-esteem supports that these personality constructs are related. More specifically, neuroticism and self-esteem show a strong negative link, whereas agreeableness, conscientiousness, extraversion, and openness are modestly related to self-esteem (Amirazodi & Amirazodi, 2011; Campbell, Rudich, & Sedikides, 2002; Erdle et al., 2009; Robins, Hendin, et al., 2001; Robins, Tracy, et al., 2001; Watson et al., 2002). However, longitudinal evidence is limited (Erol & Orth, 2011; Wagner, Lüdtkke, Jonkmann, & Trautwein, 2013), and the reciprocal link between Big Five traits and self-esteem has not yet been tested. Article 5 therefore aims to close this gap by testing the reciprocity between personality traits and self-esteem within family members of different age groups over a time span of two or three years. Analyzing individuals from different age groups might give further insight on the possible age-dependent relevance of certain Big Five traits for self-esteem development and vice versa.

2.3.1 Codevelopment in Big Five traits and self-esteem. Previous research on person-relationship transactions have studied the personality's impact on relationships and vice versa (Mund & Neyer, 2014; Neyer & Asendorpf, 2001; Robins et al., 2002). However, it would be a novel approach to also study the role of the relationship partner's personality in an individual's personality development. The TESSERA framework postulates that exposure to repeated situations that might be caused by the behavior and words of other people might foster a cascade of steps leading to personality development (Wrzus & Roberts, 2016). It

could therefore be possible that the personalities of others, through their behavior, also impact an individual's personality. In the current dissertation, we will call such partner effects of two individuals' personalities *person-person transactions*.

Within the social context, familial ties are of great importance and reflect part of the individual's developmental context (Bronfenbrenner, 1986). We know of only one study that has looked at the longitudinal influence of parental personality on the adolescent child's personality showing that parental personality traits (agreeableness, conscientiousness, and emotional stability) predict adolescent's personality traits two years later (Schofield et al., 2012). However, whether children impact their parents' personality has not yet been tested. It is thus the second goal of Article 5 to generate knowledge on the person-person transactions between family members. We investigate how parental couples and parents and offspring impact each other in their Big Five traits and self-esteem over time.

3 Research Questions

The objective of the present dissertation is to extend current research on the actor, partner, and similarity effects between Big Five traits, self-esteem, and relationship satisfaction in romantic partners. In addition, we aim to provide evidence for the possible reciprocal associations between Big Five traits and self-esteem and to examine how family members' personality traits and self-esteem impact each other over time. More specifically, the five articles included in the current dissertation address the following research questions:

1. Association between Big Five traits, self-esteem, goals, and relationship satisfaction in couples.
 - a. Do actor and partner effects exist between self-, partner-, and meta-reported Big Five traits and the satisfaction of both romantic partners? (Article 1, Article 2, Article 4)
 - b. Do actor and partner effects exist for self-esteem and relationship satisfaction in romantic couples? (Article 2, Article 3, Article 4)
 - c. Does similarity in Big Five traits, self-esteem, and goals predict satisfaction in couples? (Article 2)
 - d. Does self-esteem mediate the dyadic link between Big Five traits and relationship satisfaction? (Article 4)
 - e. Are perceptual processes mediating the association between self-esteem and relationship satisfaction, while controlling for neuroticism? (Article 3)
 - f. Does relationship satisfaction predict Big Five traits and self-esteem?
2. Reciprocal actor and partner effects between Big Five traits and self-esteem
 - a. Are Big Five traits associated with self-esteem concurrently (Article 4, Article 5) and longitudinally? (Article 5)
 - b. Does self-esteem predict Big Five traits longitudinally? (Article 4, Article 5)

- c. Are family members' Big Five traits and self-esteem associated with an individual's Big Five traits and self-esteem concurrently and longitudinally?

(Article 5)

4 Method

Sections 3.1 and 3.2 give an overview of the samples and the measurement instruments used for each article. Following these sections, section 3.3 describes the analytical strategy used.

4.1 Samples

Article 1 (Weidmann, Ledermann, & Grob, in press). In Article 1, we reviewed the literature on the actor and partner effects of self-reported, partner-reported and meta-reported Big Five traits on relationship and life satisfaction in couples. In addition, we also summarized the current evidence on the predictive validity of similarity in Big Five traits above and beyond actor and partner effects on satisfaction in couples. To gather a comprehensive overview of the literature, we searched for published peer-reviewed journal articles including the following keywords: Big Five, personality, Five Factor personality model, personality traits, personality, and romantic relationships, couples, relationship satisfaction, relationship quality, marriage, life satisfaction, and actor–partner interdependence model, dyads, actor-partner effects. Furthermore, we considered for inclusion articles cited by, or citing, articles that resulted from our searches. For actor and partner effects of self-reported Big Five traits we found nine studies testing 14 samples. For partner-reported dyadic effects, two studies were found whereas for meta-perceived personality effects, only one study was found. In addition, the review article also addressed personality agreement (i.e., do partners perceive each other similarly?) and positive illusions (i.e., do partners perceive each other more positively than they see themselves?), for which five studies were found. Finally, four studies were incorporated into the review article focusing on personality similarity effects in couples.

Article 2, Article 3, and Article 4 (Weidmann, Schönbrodt, Ledermann, & Grob, submitted; Weidmann, Gomez, Ledermann, Erol, & Grob, submitted; Weidmann, Ledermann, & Grob, 2016). In Articles 2, 3, and 4 we examined the dyadic association between Big Five traits and satisfaction and between self-esteem and satisfaction in couples.

Moreover, we described similarity and mediation effects of these associations. Article 2, 3, and 4 used the same sample from the Co-Development in Personality study (CoDiP), a SNF Sinergia project of the University of Basel, Zurich, and Lausanne (e.g., Furler, Gomez, & Grob, 2014; Schaffhuser, Allemand, & Martin, 2014). The study examined three-generations of families across four years to investigate personality development within close relationships. Participants were recruited from urban, suburban, and rural regions of German-speaking Switzerland. The sample for Article 2, 3, and 4 comprised 237 heterosexual couples that participated at time point 1 in 2010, and 141 couples again participating two years later at time point 2. Female partners were aged on average 48.4 years ($SD = 19.6$). Their male partners reported a mean age of 50.7 years ($SD = 20.1$). Married couples constituted the majority of the sample (70.9%). The couples reported an average relationship duration of 23.5 years ($SD = 17.6$).

Article 5 (Weidmann, Ledermann, Gomez, Robins, & Grob, submitted). Article 5 pursued the goal of testing the potential reciprocal link between Big Five traits and self-esteem within individuals. We also examined whether Big Five traits and self-esteem are associated constructs within family members. In particular, the goal of Article 5 was to examine parental couples and parent-offspring relationships as target relationships for codevelopment in personality. We pursued this goal by using four family studies from the Netherlands, Switzerland, and the USA. The studies included data from the California Families Project (CFP) and the Longitudinal Study of Generations (LSoG) from the USA, the Family and Personality Research Project (FPP) from the Netherlands, and CoDiP from Switzerland, from the USA. Table 1 summarizes the main characteristics of the study samples. The advantage of using these four samples was that it allowed us to investigate behavior among participants of different age groups. Whereas the CFP and FPP studies included offspring in adolescence, the CoDiP and LSoG sample included offspring in young adulthood.

Table 1

Overview of the Four Family Studies Used in Article 5 with Regard to Family Members' Mean Age (Years) and The Sex Ratio in Offspring

	CFP	FPP	CoDiP	LSoG
Father	43.3	46.0	53.2	61.7
Mother	40.8	43.7	50.4	59.3
Offspring	14.2	16.6	20.0	35.5
Female offspring	50.4%	49.5%	58.2%	54.8%

Note. *M* = Mean. CFP = California Families Project. FPP = Family and Personality Project. CoDiP = Co-Development in Personality. LSoG = Longitudinal Study of Generations.

4.2 Instruments

Article 1 (Weidmann, Ledermann, & Grob, in press). The measures used in the dyadic studies of actor and partner effects of self-, partner-, and meta-reported personality and personality similarity reviewed in Article 1 are summarized in Table 2.

Table 2
Overview of the Sample and Measures used by the Reviewed Studies of Study 1

Study	Sample	Personality measure	Satisfaction measure
Barelds, 2005	Community sample, Netherlands ($N_c = 282$)	Five-Factor Personality Inventory (Hendriks, Hofstee, & De Raad, 1999)	Dutch Relationship Questionnaire (Barelds, Luteijn, & Arrindell, 2003)
Dyrenforth et al., 2010	Household Income and Labour Dynamics in Australia ($N_c = 2,639$)	36-item adjective rating measure based on Saucier (1994)	Relationship satisfaction (1 item) Life satisfaction (1 item)
Dyrenforth et al., 2010	British Household Panel Study ($N_c = 3,277$)	15-item scale based on the Big Five Inventory (John & Srivastava, 1999)	Relationship satisfaction (1 item) Life satisfaction (1 item)
Dyrenforth et al., 2010	German Socio-Economic Panel Study ($N_c = 5,709$)	15-item scale based on the Big Five Inventory (John & Srivastava, 1999)	Life satisfaction (1 item)
Furler et al., 2013	Swiss Household Panel ($N_c = 1,608$)	10-item scale based on the Big Five Inventory (John & Srivastava, 1999)	Life satisfaction (1 item)
Furler et al., 2014	Co-Development in Personality Study ($N_c = 237$)	Big Five Inventory (John & Srivastava, 1999)	Relationship Assessment Scale (Hendrick, 1988)
Hudson & Fraley, 2014	Community sample, USA ($N_c = 174$)	NEO Five-Factor Inventory (Costa & MacCrae, 1992)	Investment Model Scale (Rusbult, Martz, & Agnew, 1998)
Neyer & Voigt, 2004	Community sample, Germany ($N_c = 100$)	NEO Five-Factor Inventory (Borkenau & Ostendorf, 1993)	Relationship Assessment Scale (Hendrick, 1988)
Orth, 2013	My Partner and I Study ($N_c = 186$)	Big Five Inventory (John, Donahue, & Kentle, 1991)	Dyadic Satisfaction subscale of the Dyadic Adjustment Scale (Spanier, 1976)
Schaffhuser et al., 2014	Co-Development in Personality Study ($N_c = 216$)	Big Five Inventory (John & Srivastava, 1999)	Relationship Assessment Scale (Hendrick, 1988)
Slatcher & Vazire, 2009	Community sample, USA ($N_c = 60$)	Big Five Inventory (John & Srivastava, 1999)	Relationship Assessment Scale (Hendrick, 1988)
Slatcher & Vazire, 2009	Community sample, USA ($N_c = 68$)	Ten-Item Personality Inventory (Gosling, Rentfrow, & Swann, 2003)	Relationship Assessment Scale (Hendrick, 1988)
Solomon & Jackson, 2014	Household Income and Labour Dynamics in Australia ($N_c = 4,103$)	36-item adjective rating measure based on Saucier (1994)	Relationship Satisfaction (1 item)

Notes. $N_c = N_{couples}$

Article 2 (Weidmann, Schönbrodt, Ledermann, & Grob, submitted). For Article 2 we analyzed data on participants' self-reported Big Five traits, self-esteem, goals, and relationship satisfaction. *Big Five traits* were measured with the German version of the Big Five Inventory (BFI; John & Srivastava, 1999; Rammstedt & John, 2005) including 45-items that are rated on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Example items include "I worry a lot" (Neuroticism) or "I am sometimes shy, inhibited" (Extraversion, reverse coded). Reliability of the BFI traits at time point 1 was satisfactory with Cronbach's alphas ranging from .71 to .85. We assessed *self-esteem* with the Rosenberg Self-Esteem Scale (Rosenberg, 1965) translated into German (von Collani & Herzberg, 2003). The scale consists of ten items, which participants rated from 1 (*strongly disagree*) to 4 (*strongly agree*). Example items include "I feel that I have a number of good qualities." The internal reliability was good ($\alpha = .86$). To assess *intrinsic and extrinsic goals*, we used the Aspirations Index in its German form (Deci & Ryan, 1997; Klusmann, Trautwein, & Lüdtke, 2005). Participants rated 28 stated goals using a four-point Likert scale ranging from 1 (*very unimportant*) to 4 (*very important*). Intrinsic goals included personal growth, relationships, community, and health, including items such as "To grow and learn new things" (personal growth). Extrinsic goals encompassed themes of wealth, fame, and image, including items such as "To have many expensive possessions". Four items represented each goal subscale. Reliabilities for intrinsic and extrinsic goals were high, with a Cronbach's alpha of .80 and .87, respectively. Lastly, *relationship satisfaction* was measured with the Relationship Assessment Scale (Hendrick, 1988) in German (Sander & Böcker, 1993). Participants rated seven items on a five-point scale ranging from 1 (*low satisfaction*) to 5 (*high satisfaction*) on items like "In general, how satisfied are you with your relationship?" Internal consistency was high ($\alpha = .91$).

Article 3 (Weidmann, Gomez, Ledermann, Erol, & Grob, submitted). Article 3 used the same scales to measure *self-esteem* and *relationship satisfaction* as Article 2. In

addition, to operationalize perceived regard and perception of the partner, we used the partner-reported and meta-reported Big Five traits. For this, the short form of the BFI (Rammstedt & John, 2005) was used. For *perceived regard*, we asked participants to put themselves in their partner's position and to think how their partner would describe them. The participants rated themselves through their partner's eyes on 21 items with a five-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). An example item is: "He [my partner] would say that I am a reliable worker" (conscientiousness item). Cronbach's alpha was satisfactory with .79. For *perception of the partner*, the same items were used. However, beforehand the participants were asked how they would describe their partner. Internal reliability was high with $\alpha = .83$.

Article 4 (Weidmann, Ledermann, & Grob, 2016). In Article 4, the same instruments for the self-reported Big Five traits, self-esteem, and relationship satisfaction were used as in Article 2.

Article 5 (Weidmann, Ledermann, Gomez, Robins, & Grob, submitted). The CFP and the CoDiP study measured the *Big Five traits* with the BFI (John et al., 1991; John & Srivastava, 1999) as described in Article 2. The FPP used a 30-item questionnaire based on the five-factor model, developed by the KUN Institute of Family Studies (Gerris, Houtmans, Kwaaitaal-Roosen, & Schipper, 1998). It represents an adaptation and translation of Goldberg's (1992) work on unipolar markers for the Big Five factor structure. Family members rated themselves on a 7-point Likert-scale from 1 (*strongly disagree*) to 7 (*strongly agree*). The LSoG used the Eysenck Neuroticism/ Extraversion scale to assess the Big Five traits neuroticism and extraversion (H. J. Eysenck & Eysenck, 1963; S. B. G. Eysenck, Eysenck, & Barrett, 1985). At the first time point used for Article 5, neuroticism and extraversion were measured with 9 yes/no questions. Three years later, the same items formulated as statements rather than questions were rated on a 4-point Likert scale ranging from 1 (*totally agree*) to 4 (*totally disagree*). To measure self-esteem, all four studies

employed the Rosenberg self-esteem scale (Rosenberg, 1965), as described in Article 2.

Reliabilities of the personality scales ranged from $\alpha = .68$ to $.90$. The internal consistencies of the self-esteem scales were high, ranging from $\alpha = .78$ to $.89$.

4.3 Analytical Strategy

The analytical strategy of all five articles incorporates the APIM (Kenny & Cook, 1999; Kenny et al., 2006) or a variation thereof. The APIM is based on the assumption that characteristics of individuals within the same relationship are interdependent and therefore impact each other. To account for this relational interdependence, the APIM controls for the initial association of both partners' predictors. In addition, the APIM computes not only actor effects, but also partner effects. In Articles 2, 3, 4, and 5, we always tested whether actor and partner effects could be set equal across partners or family members. In the following, the specific application of the APIM for each article will be described.

Article 1 (Weidmann, Ledermann, & Grob, in press). Article 1 reviews literature that has employed the simple APIM between Big Five traits and relationship or life satisfaction of couple partners. Research is also summarized that has added a similarity score to the APIM to test the similarity's contribution to satisfaction above and beyond actor and partner effects.

Article 2 (Weidmann, Schönbrodt, Ledermann, & Grob, submitted). In Article 2 we added the interaction term of both partners' personality characteristics and higher order terms of actor and partner effects into the analyses. Using polynomial regression terms resulted in an APIM with five predictors including both partners' personality characteristics, the interaction terms, and both partners' personality characteristics squared. These five effects on both partners' relationship satisfaction were used to graph the results as response surfaces, a three-dimensional depiction of the results. Response surface analyses are able to test the best-fit hypothesis, examining whether a certain combination results in high relationship

satisfaction. Finally, we tested whether constraining the interaction and higher-order terms to zero (resulting in a simple APIM) would explain the data equally well.

Article 3 (Weidmann, Gomez, Ledermann, Erol, & Grob, submitted). Article 3 examines the dyadic effects of self-esteem on relationship satisfaction and whether perceptual processes mediate these effects while controlling for neuroticism. The APIM for self-esteem on relationship satisfaction was employed with both partners' neuroticism as control variables, resulting in four predictors. In the first Actor–Partner Interdependence Mediation Model (APIMeM; Ledermann, Macho, & Kenny, 2011) we added perceived regard of both partners as mediators. In the second APIMeM, we tested both partners' perception of the other partner as mediators. For the longitudinal models, we employed a cross-lagged APIM with both partners' relationship satisfaction and self-esteem as predictors and outcome variables. Both partners' neuroticism acted as additional predictor variable.

Article 4 (Weidmann, Ledermann, & Grob, 2016). To test whether self-esteem mediates the dyadic effects between Big Five traits and relationship satisfaction in couples, we first employed simple APIM to examine the actor and partner effects of Big Five traits on relationship satisfaction. Subsequently, we tested the APIMeM with self-esteem of both partners as mediators. For the longitudinal analyses, we entered both partners' relationship satisfaction at time point 2 (two years later) as outcome variable. Relationship satisfaction of both partners at time point 1 was entered as a predictor to account for its stability. Both partners' self-esteem scores at time point 1 were entered as mediators. In a last step, we reversed the model to investigate whether relationship satisfaction at time point 1 predicted subsequent Big Five traits two years later while controlling for their stability. Again, both partners' self-esteem scores were tested as mediators.

Article 5 (Weidmann, Ledermann, Gomez, Robins, & Grob, submitted). For the analyses in Article 5, the triadic APIM was employed (Ledermann, Rudaz, & Grob, in press). For the cross-sectional analyses, the father's, mother's, and offspring's Big Five traits were

entered as predictors while their self-esteem acted as the outcome variables. For the first longitudinal analyses, Big Five traits again acted as predictors while self-esteem was entered as an outcome variable at time point 2 (two or three years later), controlling for self-esteem's stability at time point 1. For the second longitudinal analyses, the predictor and the outcome variables were reversed such that the family member's self-esteem predicted their Big Five traits later, while controlling for the traits' stability.

5 Synopsis of Results

In the following chapter, a synopsis of the results will be presented in the order of the research questions presented in section 3.

5.1 Big Five Traits, Self-Esteem, and Satisfaction in Couples

5.1.1 Big Five traits. The majority of the reviewed results in Article 1 revealed negative actor and partner effects for neuroticism, and positive actor and partner effects for agreeableness, and conscientiousness. For extraversion and openness, the results were inconsistent among studies, suggesting actor and partner effects, actor only effects, or no effects. Our own results from Article 2 and Article 4 support the general findings of the review article, indicating a significantly negative association between neuroticism and relationship satisfaction, and significant positive associations between agreeableness and conscientiousness with relationship satisfaction. Partner effects were revealed for neuroticism and agreeableness, but not for conscientiousness. No effects were found for extraversion, and a small negative partner effect emerged for openness to experience. In addition, the longitudinal models showed no significant prediction of Big Five traits for relationship satisfaction, with the exception of an actor effect of agreeableness and a marginal significant actor effect of neuroticism.

With regard to partner-perceived personality, the results of all three studies reviewed revealed actor and partner effects for all Big Five traits emerged. The review article (Article 1) further revealed that the effects of partner-perceived Big Five traits are comparable to self-reported personality traits or even larger in size. Regarding the meta-perspective of Big Five traits, i.e., how one partner thinks the other partner would rate him/her, only one study was found examining meta-perspectives. The results suggest that, except for openness to experience, all meta-perspectives of Big Five traits were associated with both partners' relationship satisfaction, above and beyond self- and partner-reported personality. Except for

conscientiousness, for which only an actor effect was found. However, the additional explained variance was minimal.

5.1.2 Self-esteem. The results of Article 2 and Article 3 revealed that self-esteem was positively linked to relationship satisfaction. In Article 3, actor effects emerged for self-esteem in both partners, whereas partner effects did not. In Article 4, self-esteem as mediator showed positive actor effects on relationship satisfaction in all Big Five trait APIMs; positive partner effects were evident in the models with conscientiousness, extraversion, and openness as predictors.

5.1.3 Personality similarity predicting satisfaction in couples. Reviewing four dyadic studies that examined similarity effects above and beyond actor and partner effects revealed that similarity plays a negligible role in predicting satisfaction in romantic couples (Article 1). Our own results supported previous research. Above and beyond actor and partner effects, little evidence exists to corroborate the role of similarity for satisfaction in couples. The simple APIM depicted the data equally well when compared to a more complex model with polynomial regression coefficients (Article 2). However, we found two exceptions for the longitudinal analyses. For openness and neuroticism, the simple APIM was worse in predicting the data. The results demonstrated that male relationship satisfaction was high if both partners are either highly neurotic or very emotionally stable. Further, male partners were unsatisfied with their relationship, when partners were very dissimilar in neuroticism. For openness, the results revealed that female partners reported high relationship satisfaction if both partners were modestly open. In contrast, female relationship satisfaction was low, when both partner reported dissimilar openness levels. In sum, personality similarity, when tested above and beyond actor and partner effects, displays little predictive validity for satisfaction in couples.

Regarding self-esteem, similar results emerged (Article 2). Comparing simple APIMs with more complex polynomial regression models revealed that the simple actor and partner

effects were equally able to depict the data well. Thus, self-esteem similarity did not play a substantial role in predicting relationship satisfaction in couples. The same was found for intrinsic and extrinsic goal similarity. However, for intrinsic goals, significant positive actor and partner effects were found concurrently, whereas for extrinsic goals, no effects emerged.

5.1.4 Self-esteem as mediator between Big Five traits and satisfaction in couples.

The results of Article 4 support the hypothesis that self-esteem acts as mediator in the concurrent associations between Big Five traits and relationship satisfaction. Particularly, self-esteem mediated the actor–actor indirect effects between all Big Five traits and relationship satisfaction such that individuals’ self-esteem mediated the associations between their Big Five traits and their relationship satisfaction. In addition, significant actor–partner indirect effects emerged for the analyses with conscientiousness, extraversion, and openness as predictors. This means that these Big Five traits were associated with their self-esteem, which was in turn linked with their partners’ relationship satisfaction. The longitudinal models did not replicate the cross-sectional findings. Only one significant actor–actor indirect effect between relationship satisfaction and later neuroticism emerged signifying that relationship satisfaction was positively associated with self-esteem, which in turn predicted later decreases in neuroticism.

5.1.5 Perceptual processes as mediators between self-esteem/neuroticism and satisfaction in couples. Results of Article 3 showed that perceptual processes mediated the concurrent association between self-esteem and relationship satisfaction. More specifically, self-esteem was positively and neuroticism negatively linked to perceived regard, while perceived regard was positively associated with both partners’ relationship satisfaction. Significant mediation for perceived regard emerged for the actor–actor and actor–partner indirect effects of self-esteem and relationship satisfaction, but also for neuroticism and relationship satisfaction.

For the perception of the partner as mediator, the results demonstrated that perception of the partner acted as a significant mediator for all four possible effects between self-esteem and relationship satisfaction. That is, perception of the partner mediated the actor–actor, actor–partner, partner–actor, and partner–partner indirect effects between self-esteem and relationship satisfaction. For example, individuals’ self-esteem was linked to how they perceived their partner, which was in turn linked to their partners’ satisfaction (actor–partner indirect effect). For neuroticism, perception of the partner only yielded one significant mediation effect: neuroticism was negatively associated with the partner’s perception of oneself (partner effect), which was in turn positively linked to one’s own relationship satisfaction (partner effect). Longitudinal mediation analyses did not replicate the concurrent findings and revealed no significant indirect effects across the time span of two years.

5.1.6 Satisfaction in couples predicting Big Five traits and self-esteem. The evidence of Article 3 and 4 indicates that relationship satisfaction yields two effects on personality traits and self-esteem. First, the results of Article 3 revealed partner effects for relationship satisfaction and self-esteem. Thus, if one partner was satisfied with the relationship, the other partner increased in self-esteem across two years. Second, the longitudinal evidence on personality traits in Article 4 revealed significant partner effects of relationship satisfaction on extraversion, signifying that individuals who reported higher relationship satisfaction tended to have partners with increased extraversion two years later.

5.2 Association between Big Five Traits and Self-Esteem

5.2.1 Big Five traits predicting self-esteem. With regard to the cross-sectional actor effects, all Big Five traits were associated with self-esteem in Article 5, replicating the results of Article 4. Neuroticism was negatively linked to self-esteem, whereas agreeableness, conscientiousness, extraversion, and openness to experience were positively associated with one’s own self-esteem. Regarding partner effects, only the association between extraversion and self-esteem reached significance.

Article 5 also tested longitudinal actor effects for Big Five traits on self-esteem. The results of three family studies uniformly demonstrate that lower neuroticism and higher agreeableness, conscientiousness, extraversion, and openness are linked to increases in self-esteem over time. Longitudinal analyses further demonstrate that in parents and their offspring, low neuroticism, high conscientiousness, and extraversion predicted later increases in self-esteem. Notably, the effects of extraversion on self-esteem were only detected in the two oldest offspring groups and the youngest parent group. Further, in parents only, openness was associated with increases in self-esteem.

5.2.2 Self-esteem predicting later Big Five traits. In Article 4, the results of the APIMeM indicated that self-esteem predicted later decreases in neuroticism. No significant effects emerged for the remaining Big Five traits. In Article 5, longitudinal actor effects of self-esteem predicting change in Big Five traits emerged for all Big Five traits. Self-esteem at time point 1 predicted increases in agreeableness, conscientiousness, extraversion, and openness and decreases in neuroticism. However, only the effects for extraversion and neuroticism emerged in at least two studies.

5.2.3 Family members' impact on Big Five traits and self-esteem. Article 5 provides little evidence for codevelopment in personality or person-person transactions in family members. The cross-sectional results indicate that individuals with extraverted romantic partners reported higher self-esteem (also found in Article 4), and that agreeable offspring tend to have mothers with higher self-esteem. The longitudinal results showed that individuals with agreeable romantic partners tended to report increased agreeableness two years later. In addition, having an extraverted partner predicted decreases in extraversion over time for women. Further, conscientious parents tended to have children with increased conscientiousness over time. Finally, agreeable children had fathers who increased in self-esteem. However, these effects have not been replicated across studies.

In sum, the effects of Article 1 to 5 were generally small to medium in size (Cohen, 1988). Small effects were found for the prediction of personality on relationship satisfaction and vice versa (Article 1 and 4). The effects between self-esteem and relationship satisfaction (Article 3) as well as Big Five traits and self-esteem were small to medium in size (Article 4 and 5). The only large effect that was found included the concurrent link between neuroticism and self-esteem (Article 5). The longitudinal similarity effects that emerged for openness and neuroticism in predicting relationship satisfaction (Article 2) and person-person transaction effects between family members (Article 5) were small. These effect sizes are in line with previous studies (e.g., Dyrenforth et al., 2010; Erol & Orth, 2013; Neyer & Asendorpf, 2001; Schofield et al., 2012).

6 General Discussion

The present dissertation aimed to extend current research by investigating Big Five traits, self-esteem, and satisfaction in romantic couples and family members. In particular, the research questions of the current dissertation addressed the predictive validity and reciprocity of Big Five traits, self-esteem, and relationship satisfaction as well as similarity in personality and its prediction of satisfaction in couples. In addition, the codevelopment in Big Five traits and self-esteem were examined in romantic couples and families. Our results highlight the importance of personality, especially neuroticism, agreeableness, conscientiousness, self-esteem, and intrinsic goals for the couple's satisfaction. They also revealed that relationship satisfaction of one partner, mediated by self-esteem, impacts later decreases in neuroticism and that the partner's satisfaction predicts later increases in neuroticism and self-esteem. This demonstrates, that person-relationship transactions can also be found with regard to relationship satisfaction. Further, we were able to demonstrate that similarity plays a negligible role in predicting satisfaction above and beyond the contribution of both partners' personality. With regard to the link between Big Five traits and self-esteem, our results are the first to reveal the reciprocal longitudinal association between these personality constructs and to highlight their conjoint importance in affecting the development of the other. Finally, the current evidence finds little support for codevelopment in personality in families with adolescent and young adult offspring and therefore offers new outlooks for the study of codevelopment in personality within family members.

In the following, the results will be discussed in the light of the theoretical background. Afterwards, the strengths and limitations of the present dissertation will be outlined, followed by a conclusion, which explains the theoretical and practical implications and gives an outlook for future studies.

6.1 Big Five traits and Satisfaction in Couples

Within romantic couples, neuroticism, agreeableness, and conscientiousness were most consistently linked to satisfaction (Article 1, 2, and 4). For extraversion and openness, the results are mixed. Speaking in terms of the VSA model of Karney and Bradbury (1995) the results revealed that neuroticism indicates a vulnerability factor, whereas agreeableness and conscientiousness reflect an asset for romantic relations. Dyrenforth et al. (2010) called these traits the Big Three for predicting satisfaction. These traits could be particularly important because they shape the interactions, cognitions, and emotions of relationship partners (Caughlin et al., 2000 ; Finn et al., 2013; Lehnart & Neyer, 2006; LePine & Van Dyne, 2001; Nofle & Shaver, 2006; Robins, Caspi, & Moffitt, 2000; Tobin, Graziano, Vanman, & Tassinary, 2000)

With regard to extraversion, the reviewed studies in Article 1 revealed that almost half of the studies found actor and partner effects for extraversion and satisfaction in couples. However, almost a third found no effect for extraversion. These results could be due to the smaller sample sizes in the reported studies, compared to household panels that did find actor and partner effects. Regarding openness to experience, researchers have suggested that it can reflect both an asset and vulnerability. More open partners can fight boredom within the relationship, foster excitement, and encourage their partners to engage in new experiences (Solomon & Jackson, 2014). However, openness to experience might also encourage differing interests between partners, or even infidelity (Hui, Finkel, Fitzsimons, Kumashiro, & Hofmann, 2014; Orzeck & Lung, 2005).

The reviewed evidence in Article 1 demonstrates that partner-reported personality traits are more strongly related to satisfaction compared to self-reported personality. However, these differences could be due to the shared method variance in self-reported personality traits and satisfaction, as suggested by Orth (2013), which causes actor effects to be larger than partner effects. Moreover, partner effects might be important for relationships

because they encompass an evaluation and rating of the partner. Positive partner ratings have been associated with increased relationship satisfaction (Murray et al., 1996a), as also demonstrated in Article 3. Thus, seeing the partner in a positive light might promote a more generous view on one's own relationship and foster partner satisfaction (Murray et al., 1996a).

Above and beyond self- and partner-reported personality effects, one reviewed study in Article 1 revealed that the meta-perspective of personality is linked to satisfaction of couple members. Even though meta-perspectives are closely tied to self-rated personality traits (Schaffhuser, Allemand, et al., 2014), it suggests predictive validity above and beyond self-rated personality effects. However, the explained variance was weak.

In Article 3, the initial direct effect between neuroticism and relationship satisfaction in romantic partners was not significant when both partners' self-esteem was also predicting satisfaction, although pointing toward the expected negative direction. Even though past research has repeatedly attested to the importance of neuroticism for relationship outcomes (Dyrenforth et al., 2010; Finn et al., 2013; Karney & Bradbury, 1995; Kelly & Conley, 1987), self-esteem's actor effect persisted while controlling for both partners' neuroticism. These results might hint to the proximal impact of self-esteem on the satisfaction in couples compared to neuroticism and thus to a possible mediating role, which will be discussed later with regard to Article 4.

In terms of explanatory processes between Big Five traits and relationship satisfaction, Article 3 examined whether perceptual processes mediated the association between neuroticism and relationship satisfaction. The results indicate that neurotic partners tended to more negatively perceive how their partner saw them, and the partner also perceived neurotic partners more negatively. However, neuroticism was not linked to one's own perception of the partner. The less generous perception of the partner might thus be a specific function of self-esteem, whereas perceived regard and the partner's perception of oneself are both

predicted by neuroticism and self-esteem. The current evidence was one of the first to unravel the differential effects of neuroticism and self-esteem in perceptual processes of romantic partners. The risk-regulation framework might therefore be adapted and complemented for neuroticism (Murray et al., 2006). Neuroticism, similarly to self-esteem, was related to more negative perceived regard. However, unlike self-esteem, it was not associated with a more negative view of the partner. Thus, some processes in individuals with high neuroticism and individuals with low self-esteem might be comparable in social relationships (Denissen & Penke, 2008).

Finally, the accumulated evidence of Article 1 and 2 does not suggest that the predictive validity of personality similarity in romantic couples is of great importance, above and beyond actor and partner effects. However, we found two exceptions in neuroticism and openness for the longitudinal prediction of satisfaction. We await replication studies that support these results. Possible moderating effects have not been considered. For instance, Hudson and Fraley (2014) have found that attachment styles moderated the effect of personality similarity on satisfaction, demonstrating that persons with a preoccupied attachment style are most satisfied if they are very similar or very dissimilar to their partner. The results are explained in the light that preoccupied individuals either strive to achieve a maximum degree of closeness to their partner (Slotter & Gardner, 2012) or they might be satisfied with dissimilarity because it fosters dependence between partners due to a complementary task distribution (Bohns et al., 2013).

6.2 Self-Esteem and Satisfaction in Couples

Article 3 corroborates the role that self-esteem plays for romantic relationships. Higher self-esteem was associated with more relationship satisfaction. However, only actor effects emerged underlying the importance of one's own self-esteem for relationship satisfaction. The partner effects of Article 3 pointed to the hypothesized direction (Erol & Orth, 2014; Mund et al., 2015) but were probably dampened because of the inclusion of both

partners' neuroticism. However, including closely related constructs disentangles the individual contribution of each personality construct. In our case, self-esteem was still associated with relationship satisfaction above and beyond neuroticism.

Notably, these results reinforced previous studies while additionally controlling for the impact of both partners' neuroticism. Even though neuroticism and self-esteem are strongly linked (Robins, Tracy, et al., 2001; Watson et al., 2002), the initial direct effects demonstrated that self-esteem was linked to relationship satisfaction while controlling for the impact of neuroticism. Interestingly, the direct actor and partner effects of neuroticism were non-significant in this model, while the prediction of self-esteem prevailed. In the context of romantic relationships, self-esteem proved to have independent associations with satisfaction in couples, above and beyond neuroticism, which previous research widely identified as a crucial factor for relationship outcomes (Dyrenforth et al., 2010; Karney & Bradbury, 1995; Kelly & Conley, 1987).

In line with the majority of previous studies, Article 2 did not reveal any effect of self-esteem similarity on relationship satisfaction in couples above and beyond actor and partner effects (Arrànz Becker, 2013; Erol & Orth, 2014; Robinson & Cameron, 2012). Thus, it could be argued that either self-esteem similarity is irrelevant for relationship satisfaction or that the advantages and disadvantages of similarity cancel each other out (Erol & Orth, 2014).

Although not within the main scope of this dissertation, Article 2 also examined actor, partner, and similarity effects of intrinsic and extrinsic goals. These results reproduce the evidence found for Big Five traits and self-esteem: similarity effects were not found above and beyond the simple APIM. In addition, for intrinsic goal importance significant actor and partner effects emerged, whereas for extrinsic goals, no actor and partner effects emerged. These results are in line with the notion that intrinsic goals are more instrumental than extrinsic goals in fulfilling basic needs (Deci & Ryan, 2000).

In addition, evidence of Article 4 suggests that self-esteem mediates the concurrent link of Big Five traits and relationship satisfaction. In line with the claim of Robins, Tracy, et al. (2001) that studying self-esteem and Big Five traits conjointly might reveal the processes behind Big Five traits and important life outcomes, the results suggest that self-esteem reflects a mechanism of the association between Big Five traits and relationship satisfaction. As suggested by the New Big Five model of McAdams and Pals (2006), characteristic adaptations are more closely tied to the “social ecology of everyday life” (p. 209). Big Five traits are thus more distal factors (Dyrenforth et al., 2010) than self-esteem in predicting outcomes such as relationship satisfaction.

However, no significant longitudinal mediations between Big Five traits and relationship satisfaction by self-esteem emerged (Article 4). Replicating cross-sectional mediation in a longitudinal design is only possible if all variables display equal stability (S. E. Maxwell & Cole, 2007). Since we know from past research that Big Five traits are somewhat more stable compared to self-esteem (Anusic & Schimmack, 2016), and more stable than relationship satisfaction (Mund & Neyer, 2014), it might be difficult to replicate these findings across a time span of two years.

Finally, concerning explanatory processes for the link between self-esteem and satisfaction in couples, our results are in line with previous evidence on the importance of perceived regard and perception of partner as mediators (Murray et al., 1996a). These results lend support to the risk-regulation model, suggesting that low self-esteem impedes individuals in perceiving the positive regard of their partner and seeing the partner in a more negative light, eventually leading to lower relationship satisfaction (Murray et al., 2006; Murray et al., 2000). However, our longitudinal results did not replicate the few available longitudinal studies (Murray et al., 1996b, 2000). Murray et al. (2000) found a significant mediation for perceived regard within four months, but not twelve months. Since our time gap of 24 months

was even larger, the mediation might reflect short-term explanations of the link between self-esteem and relationship satisfaction.

6.3 Satisfaction in Couples as a Predictor of Big Five Traits and Self-Esteem

According to person-relationship transactions, relationship satisfaction of one partner also exerted an impact on personality (Magnusson, 1988; Neyer et al., 2014). Our evidence lends support to the person-relationship transaction view with regard to extraversion and self-esteem (Article 3 and 4). Relationship satisfaction of the partner predicted increases in extraversion and self-esteem in the other partner. These results highlight the interpersonal nature of person-relationship transactions and are in line with sociometer theory (Leary & Baumeister, 2000), revealing that satisfaction of one partner impacts the other partner's self-esteem, replicating evidence of Schaffhuser, Wagner, et al. (2014). Our results suggest that the partner's relationship satisfaction was the driving force behind increases in extraversion and self-esteem, whereas actor effects were not found. Satisfaction of the partner thus enables individuals to develop a more generous self-evaluation (inward consequence) and increases in sociability (outward consequence). This evidence emphasizes how the partner's general satisfaction with the relationship might enable the individual to develop toward a more positive impression of the self and more outgoing associations with other people.

Direct effects of relationship satisfaction on the remaining Big Five traits of neuroticism, agreeableness, conscientiousness, and openness did not emerge (Article 4), contrasting with previous results (Mund & Neyer, 2014; Robins et al., 2002). However, our results are in line with previous research finding more personality effects on relationships, and fewer predictions of relationship characteristics on later personality (Asendorpf & Wilpers, 1998; Neyer & Asendorpf, 2001). This might be due to the difference in stability and level of specificity of traits and satisfaction over time (Mund & Neyer, 2014; Neyer & Asendorpf, 2001; Paunonen & Ashton, 2001). Recent evidence suggests that on the facet level, the subordinate level of traits, personality effects on relationship outcomes and vice versa occur

equally often and with comparable effect sizes (Mund & Neyer, 2014). Since our studies were conducted on the trait level, additional relationship effects on the facet level might have been obscured.

Furthermore, we argue that it is not only satisfaction within romantic relationships, but rather life events regarding romantic relationships, that might more strongly account for personality change, as demonstrated in previous articles (Luciano & Orth, 2016; Neyer & Asendorpf, 2001; Specht et al., 2011). Life events such as entering a romantic relationship might represent a destabilized environment, which forces the individual to adapt their personality to successfully deal with a new situation or role. In contrast, long-term relationships create a stable environment for the individual, stabilizing rather than changing personality (Caspi & Roberts, 2001; Wrzus & Roberts, 2016).

Finally, one indirect effect emerged between relationship satisfaction, self-esteem, and neuroticism suggesting that relationship satisfaction is concurrently associated with self-esteem, which in turn predicts lower neuroticism two years later (Article 4). Even without a substantial direct effect of relationship satisfaction on later decreases in neuroticism, examining indirect effects is still warranted (Hayes, 2009) and gives insight on how relationship satisfaction might be indirectly linked to later neuroticism.

6.4 Reciprocity between Big Five Traits and Self-Esteem

In line with previous research, the concurrent evidence of Article 4 and 5 attests to a strong negative association between neuroticism and self-esteem, whereas agreeableness, conscientiousness, extraversion, and openness are positively related to one's own self-esteem (Erdle et al., 2009; Robins, Hendin, et al., 2001; Robins, Tracy, et al., 2001; Watson et al., 2002). In addition, the results of Article 5 are the first to uncover the longitudinal, reciprocal nature of Big Five traits and self-esteem and thereby extended previous research on the interrelatedness of broad dispositions and characteristic adaptations. Further, these results illuminated parts of the enduring issue of the association between Big Five traits and self-

esteem (Donnellan et al., 2011). Neuroticism predicted self-esteem decrease, whereas extraversion, conscientiousness, and openness predicted increases in self-esteem. Self-esteem, on the other hand, predicted decreases in neuroticism and increases in the other four Big Five traits.

These results contribute to current evidence and theories on Big Five traits and self-esteem. First, they support the strong reciprocal link between neuroticism and self-esteem, also revealing consistent reciprocal longitudinal association. In addition, they point to a possible age-dependent relationship between extraversion and later self-esteem. Extraversion was only linked to later increases in self-esteem in family members between 20 to 45 years of age. During young adulthood, developmental tasks involve finding a social peer group and a romantic partner, starting a family, rearing children, and getting established in the work environment (Hutteman et al., 2014). The attainment of these social roles could be facilitated by extraversion entailing social acceptance, which in turn increases self-esteem (Leary & Baumeister, 2000). Second, the current evidence goes beyond the theoretical assumptions of the FFT (McCrae & Costa, 1999) by showing that the association between broad dispositions and characteristic adaptations is characterized by a shared reciprocity, supporting the New Big Five model of McAdams and Pals (2006). Further, theories on personality and self-esteem development must emphasize the intrapersonal contribution of Big Five traits on self-esteem change and vice versa in addition to social, environmental and genetic factors that fuel personality development (Kandler et al., 2010; Mund et al., 2015; Mund & Neyer, 2014; Neyer & Asendorpf, 2001; Specht et al., 2011).

6.5 Familial Impact on Big Five Traits and Self-Esteem

The interplay between Big Five traits and self-esteem seems to represent a strongly intrapersonal synergy. In Article 5, we only found little evidence for partner effects from the romantic partner, parents, or offspring on the development of Big Five traits and self-esteem. Thus, the direct effect of family members' personality traits and self-esteem on a person's

personality characteristics is almost small. There are several possible explanations for the scarcity of effects between family members. First, romantic partners might not impact each other's personality development equally in different phases of their relationships, newly dating or newly married couples might exchange stronger levels of codevelopment in comparison to more settled mid-adult couples. Second, mid-adolescent and young adult offspring might hold ambivalent feelings toward their parents (Tighe, Birditt, & Antonucci, 2016), and judge relationships with their peers and romantic partners as more important (Collins, 2003; K. A. Maxwell, 2002). Finally, Big Five traits and self-esteem might be an unfit abstraction level to study codevelopment in personality. More nuanced results could emerge when Big Five traits and self-esteem are measured on the facet or domain-specific level (Elfhag, Tynelius, & Rasmussen, 2010; Mund & Neyer, 2014).

However, the effects that emerged, although only in single studies, showed that the impact of parents on their offspring included conscientiousness and self-esteem, whereas offspring's influence on parental personality included agreeableness and parental self-esteem. Further, within parental couples, partners influence each other on agreeableness and extraversion. These effects hint to the parental role in teaching their young adult children how to be more conscientious, whereas agreeable adolescent children are associated with higher parental self-esteem. Further, partners impact each other on traits that pertain to social interactions.

6.6 Strengths and Limitations

Among the strengths of the studies included in this dissertation counts the dyadic approach employed in all of our articles in examining Big Five traits, self-esteem, and satisfaction in couples (Kenny et al., 2006). Furthermore, in Article 5, our study is among the first to employ a triadic APIM (Ledermann et al., in press) to investigate codevelopment in personality in family members. In addition, our studied samples were age-heterogeneous (Article 1-4) or contrasted with samples of different ages (Article 5) enabling us to draw

conclusions beyond specific samples, such as students or newlywed couples. Moreover, except for Article 1, all our studies provide cross-sectional and longitudinal results enabling us uncover potential biases in the mediational analyses (Article 3 and 4) or to replicate cross-sectional evidence and extending previous research with longitudinal evidence (Article 2 and 5).

There are also limitations of the current dissertation. First, the current evidence is mostly based on self-report data. Research shows that actor and partner effects might differ in size if the shared method variance is not accounted for (Orth, 2013). Further, a recent study highlights the importance of agreement between parental personality ratings of their child and the child's self-reported personality for the self-esteem development in adolescents (Luan et al., in press). However, Article 1 reviewed partner-reported and meta-reported Big Five trait effects. Likewise, the perceptual processes assessed in Article 3 also included partner ratings and perceived partner regard.

Second, our longitudinal analyses spanned two or three years. Future research could in addition examine more long-term studies to uncover the accumulative nature of person-relationship transactions and the reciprocity between Big Five traits and self-esteem over time. However, the current longitudinal evidence provides a good starting point from which to postulate new hypotheses concerning the long-term impact of the reciprocity between Big Five traits and self-esteem and codevelopment in personality.

Finally, the effects of our studies are small to medium in size and only explain a limited portion of the variance in relationship satisfaction, Big Five traits, and self-esteem. These results are in line with previous research (Dyrenforth et al., 2010; Erol & Orth, 2013). However, with regard to relationship satisfaction, the actor and partner effects are still considerable, taking into account that relationship outcomes are impacted by myriad different aspects and contexts (Bradbury, Fincham, & Beach, 2000), which include the individual (gender, personality, and attachment), the couple (i.e., commitment and trust), and external

factors, such as support from others (Le, Dove, Agnew, Korn, & Mutso, 2010). Further, small effects accumulate over time and might, over longer time periods, exert a larger impact (Soto, 2015). Small changes in personality traits could result in a large impact on important life outcomes, and fuel advantageous overall development across the lifespan (Roberts et al., 2006).

6.7 Conclusion and Outlook

The current dissertation emphasizes the role of neuroticism, agreeableness, conscientiousness, self-esteem, and intrinsic goals for relationship satisfaction. Further, the partner's relationship satisfaction also predicts increases in extraversion and self-esteem. With only few exceptions, we conclude that personality similarity with regard to Big Five traits, self-esteem, and goals are negligible when actor and partner effects are considered. In addition, the current research is novel in demonstrating that Big Five traits and self-esteem impact each other's development over time. Finally, only little evidence emerged for person-person transactions in family members' personality traits on an individual's Big Five trait and self-esteem change.

With regard to the Big Three for relationship satisfaction – neuroticism, agreeableness, and conscientiousness – future research needs to further examine the underlying processes explaining these actor and partner effects on relationship satisfaction in romantic couples. One recent study, for instance, studied couples in conflict situations and found that emotion regulation, interpersonal behavior, and state relationship mediated the link between Big Five traits and relationship satisfaction six months later (Vater & Schröder-Abé, 2015). For extraversion and openness, however, differential effects must be investigated to more fully understand the inconsistent body of evidence. We were able to uncover similarity effects for openness revealing that similarity on a modest level predicted high relationship satisfaction. It seems that a non-linear assumption might better match the prediction of openness for relationship satisfaction.

A promising research direction regarding similarity effects between the personality traits and characteristics of romantic partners seems to study perceived rather than actual similarity (Avivi, Laurenceau, & Carver, 2009). However, perceived similarity reports can be biased by the satisfaction of partners whereas actual similarity can predict satisfaction without the conscious knowledge of partners (Hudson & Fraley, 2014). Hence, actual similarity still reflects an appropriate construct. In addition, an important point raised by Wood and Furr (2016) is that positive similarity effects emerge because researchers have not controlled for the normative-desirability confound when testing profile correlations as similarity index. More specifically, the authors argued that overall similarity is confounded by having a normative as well as a desirable profile. As a result, effects emerge not because romantic partners are in fact similar in traits that distinguish them from others, but because they report normative and desirable personality characteristics (Wood & Furr, 2016). Such effects need to be considered in the future.

With regard to the personality-relationship transactions, recent research highlights the necessity of testing for relationship effects on personality facets (Mund & Neyer, 2014). Thus, future research might lay a greater focus on the facet level of traits. Further, personality-relationship transactions might be found to be most strong during relationship transitions, such as entering a new romantic relationship (Lehnart et al., 2010; Luciano & Orth, 2016; Neyer & Asendorpf, 2001). Thus, instead of focusing on an age-heterogeneous sample, future investigations might target couples that have just entered their relationship or are affected by life events with regard to their relationship, such as beginning to share a home or divorcing (Specht et al., 2011).

Article 5 was the first study to test the reciprocal link between Big Five traits and self-esteem. Thus, replication studies are needed to support the current evidence. Further, only one additional study has tested age effects in the associations between Big Five traits and self-esteem (Robins, Tracy, et al., 2001), finding no age interaction effects. However, future

research might examine a curvilinear as well as a linear moderating role of age. Our findings from the prediction of extraversion on later levels of self-esteem point to a possible age-dependency, where extraversion reflects a resource, especially for later increases in self-esteem during the age of around 20 to 45 years.

Regarding codevelopment in family members' personality, future research could benefit from employing a facet level approach as mentioned above (Mund & Neyer, 2014). In addition, the consideration of moderators such as relationship quality or ambivalence between parents and their offspring (Tighe et al., 2016) or age of the child (Schofield et al., 2012) might further illuminate how codevelopment in personality among family members might occur.

The results of the present dissertation bear important implications. With regard to theoretical implications, our results indicate that in terms of the VSA model (Karney & Bradbury, 1995) neuroticism reflects a vulnerability for romantic relationships, whereas agreeableness, conscientiousness, self-esteem, and intrinsic goals are assets for couples. In addition, because the partners' satisfaction predicted later increases in extraversion and self-esteem, personality development can be seen as an interpersonal process, wherein which the partner's satisfaction and well-being within the relationship enables individuals to change with regard to their extraversion and self-esteem. Further, the results regarding neuroticism and perceptual processes suggest that the risk-regulation framework (Murray et al., 2006) can be extended such that neuroticism and self-esteem share similar functions regarding perceived regard and the resulting felt security in couples. In addition, our results provide a first answer to the question of whether broad dispositions and characteristic adaptations, such as self-esteem, are reciprocally linked. Since these effects have been found consistently across three longitudinal studies, we are confident in their robustness and implications for personality models that do not acknowledge a possible reciprocity (McCrae & Costa, 1999). Finally, with regard to codevelopment in personality, although our results were sparse, they raise further

questions on the conditions under which family members' Big Five traits and self-esteem impact each other.

Regarding practical implications, the current results indicate that within couples increases in extraversion and self-esteem are impacted by the partners' satisfaction with the relationship. Hence, personality development in these two traits is also impacted by interdependent processes between partners and could therefore be fostered in couple therapy when supporting the couple members' satisfaction with their relationship. However, such interventions need to be tested empirically before implementing them in the therapy setting. Further, the intergenerational effects between parents and their offspring suggest that conscientiousness in children can be fostered by the conscientiousness in parents and that the agreeableness of the child contributes to parental self-esteem. These insights can be useful in family therapy settings.

To conclude, Erich Fromm stated that individuals' personality seems to be their most important endeavor. Our results support the relevance of personality, especially for relationship and life satisfaction in couples. In addition, the presented evidence demonstrates that the partner's satisfaction and close other's personality partly shape personality development in individuals, which makes "man's most important endeavor", not a socially isolated, but a socially embedded enterprise.

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APPENDIX A: Article 1

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INTERDEPENDENCE OF PERSONALITY AND SATISFACTION IN COUPLES

1

The Interdependence of Personality and Satisfaction in Couples: A Review

Rebekka Weidmann

University of Basel

Thomas Ledermann

Utah State University

Alexander Grob

University of Basel

Author Note

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Rebekka Weidmann, Thomas Ledermann, Alexander Grob, Department of
Psychology, University of Basel, Switzerland

Correspondence concerning this article should be addressed to Rebekka Weidmann,
Department of Psychology, University of Basel, Missionsstrasse 62, 4055 Basel, Switzerland.
E-mail: rebekka.weidmann@unibas.ch

INTERDEPENDENCE OF PERSONALITY AND SATISFACTION IN COUPLES 2

Abstract

Personality has been found to play an important role in predicting satisfaction in couples. This review presents dyadic research on the association between Big Five traits and both life and relationship satisfaction in couples focusing on self-reported personality, partner-perceived personality (how the partner rates one's own personality), and personality similarity. Furthermore, special attention is given to possible gender effects. The findings indicate the importance of self-reported as well as partner-perceived reported personality for the satisfaction of both partners. Specifically, the majority of studies found intrapersonal and interpersonal effects for neuroticism, agreeableness and conscientiousness on life or relationship satisfaction. For the partner-perceived personality, intrapersonal and interpersonal effects were present for all Big Five traits. Partners' similarity in personality traits seems not to be related with their satisfaction when controlling for partners' personality.

Word count: 131

Keywords: Personality, Big Five, Life Satisfaction, Relationship Satisfaction, Romantic Couples, Dyadic Data, APIM

INTERDEPENDENCE OF PERSONALITY AND SATISFACTION IN COUPLES 3

The Interdependence of Personality and Satisfaction in Couples: A Review

Romantic relationships are fundamental for most people's happiness (Baumeister & Leary, 1995). Researchers from different fields have encountered the question of why some couples are more satisfied than others. Personality has been repeatedly found to predict why some couples are satisfied with their life and relationship and others are not (Heller, Watson, & Ilies, 2004; Karney & Bradbury, 1995; Robins, Caspi, & Moffitt, 2000).

Three important questions have emerged from studying the association between personality and satisfaction in couples. First, how does both partners' personality contribute to their satisfaction? Second, is the satisfaction of the couple influenced by the way partners perceive each other? Finally, is personality similarity relevant for satisfaction in romantic relationships? This review addresses these questions by presenting studies incorporating both actor and partner effects on the association of self-reported Big Five traits and life and relationship satisfaction in couples. Furthermore, we also included studies on partner-perceived Big Five traits and assessing effects of Big Five similarity. The Big Five traits (McCrae & John, 1992) encompass neuroticism (i.e., the extent to which individuals are prone to feeling anxious, tense and worrying), extraversion (being outgoing, energetic and assertive), agreeableness (i.e., being appreciative, trusting and generous), conscientiousness (i.e., the ability to be organized, dutiful, and reliable), and openness to experience (i.e., curiosity, unconventionality and imagination).

In the last two decades, with the emergence of the actor-partner interdependence model (Kenny, 1996) framework, couple research started taking into account the interdependent nature of data involving both partners (Kenny & Cook, 1999; Kenny, Kashy, & Cook, 2006). Drawing from social interdependence theory (Johnson & Johnson, 2005) and the dyadic patterns outlined by Kenny and colleagues (Kenny & Cook, 1999; Kenny & Ledermann, 2010), the combination of actor (intrapersonal) and partner (interpersonal) effects can be classified into four different categories (Figure 1). A first possibility is the existence of

INTERDEPENDENCE OF PERSONALITY AND SATISFACTION IN COUPLES 4

both actor and partner effect, which can be called *mixed*. A second possibility is the existence of an actor effect and the absence of the corresponding partner effect, referred to as *independence*. A third possibility, called *dependence*, is the existence of a partner effect and absence of the corresponding actor effect. Finally, the absence of both actor and partner effects is called *unrelatedness*. The results of the studies presented in this review will be interpreted in the light of this scheme illustrated in Figure 1.

In the following, we first outline the literature on personality and satisfaction. We then focus on associations between personality perception and satisfaction, followed by personality similarity and satisfaction. Finally, we present our conclusions and recommendations for future research. Although the main focus of this review lays on studies incorporating an APIM approach, studies based on data of only one partner are included in the introduction of each section.

Personality and Satisfaction

From an intrapersonal perspective, personality and satisfaction are expected to be associated because those traits represent the toolbox with which an individual is equipped to shape the relational environment (Dyrenforth, Kashy, Donnellan, & Lucas, 2010). One of the most prominent theories that explain why personality relates to satisfaction in couples is the vulnerability–stress–adaptation model of Karney and Bradbury (1995). This theory suggests that personality influences the way individuals adapt and contribute to stressful events. Therefore, personality can be either characterized as strength for the partnership or as vulnerability that jeopardizes partners' satisfaction.

A second theory that focuses on the interaction between a person and the social environment is the personality-relationship transaction perspective of Neyer and Asendorpf (2001). It suggests that personality and social relationships interact and influence each other reciprocally. However, these transactional effects are not in equilibrium. Interpersonal

INTERDEPENDENCE OF PERSONALITY AND SATISFACTION IN COUPLES 5

experiences are expected to be more contingent on an individual's personality and less on the partner's personality (Barelds, 2005). Thus, the association between an individual's personality and his or her own satisfaction is expected to be stronger than the association with the partner's personality. Yet, interpersonal effects, also called partner effects, are important to consider due to the fact that they more precisely depict the way two partners influence each other (Dyrenforth et al., 2010). Theoretical assumptions for partner effects are drawn from the aforementioned vulnerability–stress–adaptation model and the social interdependence theory (Johnson & Johnson, 2005), which state that the outcomes of partners are influenced by the actions of each other. Because personality is a strong predictor of behavior (Paunonen & Ashton, 2001) it becomes evident that one's own personality also affects both partners' satisfaction.

Empirical evidence on individual data corroborates the aforementioned theories showing that neuroticism is one of the strongest personality predictors for relationship outcomes, such as quality, satisfaction, and stability, followed by agreeableness, conscientiousness and extraversion. Openness for experience shows the smallest effects on relationship outcomes (Heller et al., 2004; Karney & Bradbury, 1995)

Our search yielded nine couple studies reporting actor and partner effects of Big Five traits on satisfaction in fourteen samples.¹ - All these studies have either looked at relationship quality and satisfaction or life satisfaction of both partners as outcome variables. The findings of the couple studies are summarized in Table 1. Couple studies examining the association of neuroticism and satisfaction support the literature on individual data. Specifically, a majority of these studies imply a mixed pattern suggesting that one's own and the partner's neuroticism are linked to relationship and life satisfaction (Barelds, 2005; Dyrenforth et al., 2010; Furler, Gomez, & Grob, 2013; Orth, 2013; Solomon & Jackson, 2014). Aside from the studies of Barelds (2005) and Orth (2013) all evidence originated from large panel data sets conducted in Australia, Germany, Great Britain, and Switzerland (Dyrenforth et al., 2010;

INTERDEPENDENCE OF PERSONALITY AND SATISFACTION IN COUPLES 6

Furler et al., 2013; Solomon & Jackson, 2014). Three studies suggest either an independence or a dependence pattern: Three studies using the data from the Co-Development in Personality study in Switzerland and a U.S. student sample found that only actor but not partner effects of neuroticism predicted relationship satisfaction (Furler, Gomez, & Grob, 2014; Schaffhuser, Allemand, & Martin, 2014; Slatcher & Vazire, 2009). Results from a small sample of dating couples from the United States found only partner, but no actor effects for neuroticism (Slatcher & Vazire, 2009). Finally, one study examining young adult couples from Germany found an unrelated pattern for neuroticism (Neyer & Voigt, 2004).

The majority of studies on agreeableness also showed a mixed pattern, suggesting that being trusting, altruistic, compliant, and tender-minded toward other people (John & Srivastava, 1999) was important for both partners' satisfaction (Barelds, 2005; Dyrenforth et al., 2010; Furler et al., 2013; Neyer & Voigt, 2004; Orth, 2013; Schaffhuser, Allemand, et al., 2014; Solomon & Jackson, 2014). Three studies contradict the tenor of most studies and suggest that agreeableness is either only found in actor effects suggesting an independence pattern (Furler et al., 2014; Slatcher & Vazire, 2009) or that agreeableness is unrelated to the satisfaction of both partners (Slatcher & Vazire, 2009).

More inconsistent evidence exists with regard to conscientiousness. On the one hand, studies using panel data sets found a mixed pattern for conscientiousness suggesting that being reliable, dependable, and responsible relate to both partners' relationship and life satisfaction (Dyrenforth et al., 2010; Furler et al., 2013; Solomon & Jackson, 2014). On the other hand, studies with smaller sample sizes – although on average larger than most couple studies (Cooper & Sheldon, 2002) – suggest an independence pattern, which only underlines the intrapersonal importance of conscientiousness for satisfaction (Barelds, 2005; Furler et al., 2014; Neyer & Voigt, 2004; Orth, 2013; Schaffhuser, Allemand, et al., 2014). The study with the smallest sample sizes found unrelated patterns for conscientiousness and satisfaction (Slatcher & Vazire, 2009).

INTERDEPENDENCE OF PERSONALITY AND SATISFACTION IN COUPLES

7

Regarding extraversion, some studies found a mixed pattern (Barelds, 2005; Dyrenforth et al., 2010; Furler et al., 2013; Orth, 2013), whereas other studies found an independence pattern (Dyrenforth et al., 2010; Solomon & Jackson, 2014) or an unrelated pattern (Furler et al., 2014; Neyer & Voigt, 2004; Schaffhuser, Allemand, et al., 2014; Slatcher & Vazire, 2009). In conclusion, whether the partner's extraversion is important for one's own satisfaction is still debatable and there doesn't exist enough evidence leaning in one direction. Studies showing no relation between extraversion and satisfaction investigated this link with a smaller sample size compared to panel datasets (Furler et al., 2014; Schaffhuser, Allemand, et al., 2014; Slatcher & Vazire, 2009).

Similarly, inconsistent evidence exists for openness to experience. Some evidence suggests that openness to experience matters for both partners' satisfaction (Dyrenforth et al., 2010; Solomon & Jackson, 2014), other studies report an independence pattern and find that openness to experience is only important from an intrapersonal perspective (Dyrenforth et al., 2010; Furler et al., 2013). Two studies found contradictory partner effects suggesting either a positive or a negative association between the partner's openness to experience and satisfaction (Neyer & Voigt, 2004; Schaffhuser, Allemand, et al., 2014). Finally, an unrelated pattern revealed in some studies (Furler et al., 2014; Orth, 2013; Slatcher & Vazire, 2009).

Gender as moderator

Most studies examining the association between Big Five traits and satisfaction did not find that actor and partner effects vary by gender (Barelds, 2005; Furler et al., 2013, 2014; Orth, 2013; Schaffhuser, Allemand, et al., 2014; Slatcher & Vazire, 2009). However, two studies suggest that being with an agreeable partner is more beneficial for females' than for males' relationship satisfaction (Dyrenforth et al., 2010; Solomon & Jackson, 2014), whereas one study finds only partner effects of agreeableness for men but not for women (Neyer & Voigt, 2004). Furthermore, men were more satisfied with their relationship when their wives reported higher levels of extraversion (Dyrenforth et al., 2010) and that women reported

INTERDEPENDENCE OF PERSONALITY AND SATISFACTION IN COUPLES 8

higher levels of marital satisfaction when they and their spouses were less neurotic (Solomon & Jackson, 2014) and their partners were more open to new experiences (Neyer & Voigt, 2004). Moreover, conscientiousness only showed actor effects for female and an unrelated pattern for male partners (Neyer & Voigt, 2004). In conclusion, the findings on gender effects are scarce and inconsistent and, therefore do not depict a univocal picture on the issue of gender differences.

Discussion

Taken together, research on Big Five traits and satisfaction in couples suggests the importance of looking at different patterns of interdependency. The “Big Three” (Dyrenforth et al., 2010) of personality traits — neuroticism, agreeableness and conscientiousness — are more consistently linked to both partners’ life and relationship satisfaction whereas extraversion and openness for experience show inconsistent patterns. However, both actor and partner effects of personality traits explain only little of the variance in satisfaction in couples (Dyrenforth et al., 2010; Schaffhuser, Allemand, et al., 2014)

Many studies have elaborated on the discussion of why neuroticism, agreeableness and conscientiousness should be valid predictors of couple satisfaction (Karney & Bradbury, 1995; Kelly & Conley, 1987; Watson, Hubbard, & Wiese, 2000). Evidence suggests that neuroticism is linked to various behaviors, cognitions, and emotions that are detrimental for romantic relationships (Caughlin, Huston, & Houts, 2000 2000; Finn, Mitte, & Neyer, 2013 2013; Nofle & Shaver, 2006). In contrast, agreeableness is rather associated with a secure attachment style, emotion regulation efforts, and constructive communication behavior (Lehnart & Neyer, 2006; LePine & Van Dyne, 2001; Tobin, Graziano, Vanman, & Tassinary, 2000 & Tassinary, 2000). Finally, conscientiousness have been found to be associated with the way individuals manage and control discord in relationships (Robins et al., 2000).

In contrast, results for extraversion and openness were inconsistent. Some studies found evidence for a mixed or independence pattern (Dyrenforth et al., 2010) other studies

INTERDEPENDENCE OF PERSONALITY AND SATISFACTION IN COUPLES 9

found support for a dependence or unrelated pattern (Neyer & Voigt, 2004; Schaffhuser, Allemand, et al., 2014; Slatcher & Vazire, 2009). Extraversion may positively influence the relationship with the experience of positive affect (Watson & Clark, 1997). However, one study that will be discussed in more detail has suggested, that partner-perception might be more important because of the social interactive nature of extraversion (Schaffhuser, Allemand, et al., 2014). With regard to openness to experience, it may portray a double-edged sword for romantic relationships. Solomon and Jackson (2014) argued that openness to experience could on the one hand foster the excitement, new experiences, and thus eliminate boredom in the relationship. On the other hand, openness to experience could foster extra-relational infidelity or, less dramatically differing interests between partners (Hui, Finkel, Fitzsimons, Kumashiro, & Hofmann, 2014; Orzeck & Lung, 2005).

Finally, significant gender interactions emerged for neuroticism, agreeableness, extraversion and openness to experience (Barelds, 2005; Dyrenforth et al., 2010; Neyer & Voigt, 2004; Solomon & Jackson, 2014). We recommend taking an additional look at potential gender differences to further investigate the complex association between personality and satisfaction.

Personality Perceptions and Satisfaction

The world romantic partners live in is biased by the subjective perception of their partner and their relationship (Furler et al., 2014). How romantic partners perceive each other in their relationship and perceive themselves through the partner's eyes – even though this perception might be far off from reality (Murray, Holmes, & Griffin, 2000) – constitutes their subjective image of their partner and themselves.

Even though self- and other perceptions are very often fairly similar in making predictions about a person's behavior, other perceptions are not redundant constructs to self-perceptions (Vazire, 2006; Vazire & Carlson, 2011). Consequently, it is often important to not

INTERDEPENDENCE OF PERSONALITY AND SATISFACTION IN COUPLES 10

only rely on self-reports, but rather include other-reports whenever possible (Vazire, 2006) because they might be better in predicting outcomes (Jackson, Connolly, Garrison, Leveille, & Connolly, 2015). Research shows that other perceptions shed light on a different point of view and add to the understanding of relationships (Furler et al., 2014; Vazire & Carlson, 2011). Furthermore, a person might not necessarily be best in rating his or her own personality because some aspects are obscured through cognitive biases and self-enhancement motives (Sedikides & Gregg, 2008; Vazire & Carlson, 2011). Even though other-reports represent a valuable addition to self-reports, they might also be biased (Kenny, 2004).

In addition, partner perceptions are relevant for couple's satisfaction because they guide thoughts, emotions, and behavior toward the partner and, thus, can contribute to the satisfaction of the couple. For instance, a person perceiving the partner as neurotic might not disclose worrisome thoughts to the partner in order to prevent any anxious reactions of the partner. It is therefore crucial to not only look at the link between self-reported but also at partner-perceived personality in order to better understand couples' satisfaction.

Partner perception

Research has suggested that being positively perceived by the partner enhances satisfaction in romantic couples (Murray, Holmes, & Griffin, 1996; Watson et al., 2000). However, studies employing a dyadic approach are scarce. One study looked at partner-perceived personality and found that perceiving the partner to be extraverted, agreeable, conscientious, emotionally stable, and open to experience was associated with increased relationship satisfaction of both partners (Orth, 2013). Interestingly, partner-perceived personality effects were more strongly associated with satisfaction of both partners than self-reported personality (Orth, 2013). Moreover, the partner-perceived personality associations showed a different pattern of effects where partner and actor effects were similar in size or partner effects were stronger than actor effects.

INTERDEPENDENCE OF PERSONALITY AND SATISFACTION IN COUPLES 11

A study by Furler et al. (2014) found more contradictory results between self- and partner-reported personality on satisfaction. The self-reported effects of personality on satisfaction were all small in size and mostly non-significant, with the exception of agreeableness and conscientiousness, whereas the partner-perceived personality on all Big Five traits produced actor and partner effects that were small to medium in magnitude. Moreover, partner-rated effects explained at least 10 percent more variance in relationship satisfaction than self-reported effects. Furthermore, one study added partner-perceived to self-reported personality predictors which incrementally explained between 11 and 26 percent of the variance in satisfaction (Schaffhuser, Allemand, et al., 2014). In all three studies, no gender effects emerged signifying equal effects for women and men. These study results undergird the incremental importance of studying partner perceptions in romantic relationships above and beyond self-reported personality.

Meta-perception

In addition to partner-perception, the meta-perspective of personality (how I think my partner sees me) is a valuable source of self-knowledge. Studying meta-perspectives in general, reaches back to the early times of psychological research. Cooley's notion of the looking glass self as one of the most prominent theories proposes that the self is construed by the perceived regard of other people (Cooley, 1902). Forming meta-perspectives is a complex cognitive process, whereat the person involved has to possess an advanced amount of self-perception in order to merge self-perceptive knowledge with received social feedback. Furthermore, the person forming a meta-perception has to know how other people weigh information about the person (Albright & Malloy, 1999). Murray et al. (2000) have called this meta-perspective *perceived regard* — the way a person perceives himself or herself through the partner's eyes. A positive perceived regard is crucial for romantic relationships because it gives intimate partners a sense of felt security about their romantic relationships. A positive perceived regard or meta-perspective thus helps to reduce the vulnerability within a

INTERDEPENDENCE OF PERSONALITY AND SATISFACTION IN COUPLES 12

relationship and the risk of getting hurt (Holmes & Murray, 2007; Murray, 2005; Murray, Bellavia, Rose, & Griffin, 2003; Murray et al., 2000).

We are aware of one couple study that has looked at meta-perspectives with respect to the Big Five traits and satisfaction (Schaffhuser, Allemand, et al., 2014). The authors tested actor and partner effects of meta-perspectives on relationship satisfaction and the incremental validity of meta-perceptions above and beyond self- and partner-perception. Results suggest that meta-perceptions of neuroticism were negatively associated, whereas extraversion, and agreeableness were positively associated with both partners relationship satisfaction (mixed pattern). Meta-perspectives about conscientiousness only displayed substantial actor effects and therefore an independence pattern. Finally, for openness to experience an unrelated pattern was found. All effects were statistically equal for men and women explaining up to 3 percent of variance above self-reported and partner-reported personality.

Perceptual agreement and positive illusions

Some studies have looked at the difference between partner perception and the partner's self-perception using various terms (e.g., perceptual agreement/accuracy, positive illusions). Two theoretical assumptions are the leading forces behind studying these various perceptual associations: self-verification theory and self-enhancement theory. On the one hand it has been hypothesized that a high congruence (agreement) between self-perception and partner's perception is beneficial for romantic relationships. Self-verification theory postulates that people want to be self-verified in their self-views and might "actively seek, elicit, and recall social feedback that confirms their self-conceptions" (Swann & Read, 1981, p. 352). Furthermore, self-verification enables partners to interact with each other more smoothly and more predictably because their perceptions are in line with each other (Letzring & Nofhle, 2010).

Studies examining perceptual accuracy or agreement of Big Five traits in romantic relationships found small actor and partner effects of agreement in Big Five traits on

INTERDEPENDENCE OF PERSONALITY AND SATISFACTION IN COUPLES 13

relationship satisfaction (Decuyper, De Bolle, & De Fruyt, 2012; Furler et al., 2014; Luo & Snider, 2009). Decuyper et al. (2012) and Furler et al. (2014) used profile agreement, whereas Luo and Snider (2009) applied partial correlation of one person's perception of the partner and the partner's self-perception. However, when controlled for actor and partner ratings of personality traits, the agreement effects fail to reach significance (Furler et al., 2014). Inconsistent with these findings, Letzring and Nofle (2010) using different methodological approaches to assessing agreement found that especially in married, compared to dating and cohabiting couples self-verification of both partners could substantially predict relationship quality, above and beyond both partners' self-rated personality.

On the other hand, the self-enhancement perspective suggests that people desire to be perceived more positively than negatively from their social environment (Taylor & Brown, 1988). Researchers have underlined the importance of so-called positive illusions (Murray et al., 1996) – being seen more positively by the partner than by oneself. Positive illusions can serve both partners in a relationship. The person who is perceived more positively is able to retain or increase his or her self-esteem, which is likely to lead to positive biased self-concepts (Brown, Collins, & Schmidt, 1988 1988; Leary, 2007). In addition, the partner who holds positive illusions about the other partner benefits from these biases. In the process of committing more to the relationship and to the partner, the realization that the partner is not perfect will likely dawn on romantic partners. When commitment and investment are high the assurance that the partner is “the right one” has to be retained. Thus, resolving the cognitive dissonance that so much has already been invested in a relationship with a potentially wrong partner, individuals form positive illusions about the partner in order to uphold the reasons for staying in a relationship (Murray et al., 1996).

One study that tested the hypothesis of positive illusions about Big Five traits found that positive illusions are not very common in relationships (Barelds & Dijkstra, 2011). Only one positive bias emerged to the extent that men tended to rate their partners more

INTERDEPENDENCE OF PERSONALITY AND SATISFACTION IN COUPLES 14

conscientious then they rated themselves. Nevertheless, positive illusions on all Big Five traits had effects on both partners' relationship quality equally for men and women (Barelds & Dijkstra, 2011). Another study also found that positivity bias or positive illusions in Big Five traits were associated with marital satisfaction in newlywed couples finding no gender differences (Luo & Snider, 2009). Both studies tested for differences but none were significant (Luo & Snider, 2009). Complementary to examining positive illusions, the authors also assessed accuracy in Big Five traits and found actor and partner effects that contributed to marital satisfaction — in addition to positive illusions. These results suggest that accuracy and positive biases in romantic relationships were not “exclusive but mutually beneficial” (Luo & Snider, 2009, p. 1332)

Discussion

The findings reveal that the inclusion of partner-reported personality underscores that how partner perceive each other is of greater value for satisfaction than how they perceive themselves because it determines how they behave, think, and feel towards their partner. Evidence suggests that an individual's personality is pivotal for that person's satisfaction, regardless of changing partners (Robins, Caspi, & Moffitt, 2002). It can be assumed that self-reported personality is linked to partner perception and that the way individuals perceive their social environment represents parts of who they are. Some evidence suggests for instance that personality is linked to how individuals perceive interactions with a study partner (Cuperman & Ickes, 2009) where agreeable individuals for example reported more often that the interaction was involving and that they felt accepted by the study partner. Moreover, evidence suggests that self-reported personality traits are linked to seeing the partner in a more positive light than he or she does (Barelds & Dijkstra, 2011). Therefore, it is essential to find out what role self-reported personality plays in the process of perceiving the partner.

INTERDEPENDENCE OF PERSONALITY AND SATISFACTION IN COUPLES 15

Notwithstanding its relevance, to our knowledge no study on partner perception on Big Five traits has looked at either the longitudinal link or the reciprocal link between partner-perception and couple satisfaction.

It is important to note that the predictive validity of meta-perspectives in personality was generally weak. The conclusions drawn from the evidence are tempered by the fact that no replication studies are available so far. In addition, evidence indicates that meta-perspectives about the relationship in general and not the personality might be more crucial for satisfaction (Lorimer & Jowett, 2009). Further, it is possible that there are differential preferences about a person's perceived regard. Some people might ascribe more importance to a perceived regard about high conscientiousness, others to agreeableness or openness to experience. To our knowledge, such moderating factors have not been examined so far.

Lastly, evidence on perceptual accuracy and positive illusions suggests that both processes are mutually helpful for satisfaction in intimate relationships (Barelds & Dijkstra, 2011; Luo & Snider, 2009). Nevertheless, research suggests that these effects have to be looked at with control for main effects of self-reported personality to prevent the overestimation of results (Furler et al., 2014). Additional studies are needed that determine in more details in what areas perceptual accuracy is more valuable and when it is more crucial for partners to have a rosier view on the partner. Finally, as suggested by one of the reviewers, positive illusions might only be beneficial for certain personality characteristics depending on whether they matter more or less for the partners. It would be beneficial to weigh personality ratings by their importance before looking at the associations between positive illusions and satisfaction.

Personality Similarity and Satisfaction

Almost forty years ago, Tversky (1977) described similarity as an omnipresent principle in psychology. Similarity is not only in general psychology, but specifically in couple research, a

INTERDEPENDENCE OF PERSONALITY AND SATISFACTION IN COUPLES 16

topic of great interest. On the one hand, “birds of a feather flock together” or “like will to like” are often used phrases to express the belief that similar people belong together. Indeed, research on romantic couples suggests that in terms of politic orientation, religion, and education partners who are more alike will more likely be dating or getting married (Alford, Hatemi, Hibbing, Martin, & Eaves, 2011; Eaves & Hatemi, 2011). On the other hand, another common phrase states “opposites attract”. This is supported by genetic research suggesting that hereditary complementarity (genetic dissimilarity) attracts partners to each other (Garver-Apgar, Gangestad, Thornhill, Miller, & Olp, 2006).

Thus, the current question is whether it is beneficial for romantic relationships to be similar or dissimilar in terms of personality. It has been argued that similarity is an element of relationship quality because it decreases disagreements between spouses (Rammstedt, Spinath, Richter, & Schupp, 2013), and facilitates the coordination of thoughts, behaviors, as well as the accuracy of perceiving the partner’s emotions (Anderson, Keltner, & John, 2003). Furthermore, similarity might strengthen intimate feelings, such as understanding and validating the partner (Reis & Shaver, 1988), and contribute to relationship longevity (Arranz Becker, 2013). Studies report inconsistent results for the positive effects of personality similarity on satisfaction in couples. Some studies found evidence that personality similarity is beneficial for romantic relationships (Gaunt, 2006; Karney & Bradbury, 1995; Luo & Klohnen, 2005; Nemecek & Olson, 1999), while others did not find such effects (Barelds & Dijkstra, 2007; Gattis, Berns, Simpson, & Christensen, 2004). Moreover, the results differ depending on the manner of how similarity was measured (Luo et al., 2008). Decuyper et al. (2012) found that profile similarity had substantial incremental validity above both partners’ personalities in explaining relationship satisfaction. Additionally to actual similarity, the study of Decuyper et al. (2012) examined perceptual similarity (ratio between self- and partner-ratings of personality) and found that this similarity was not relevant for men’s but for women’s relationship satisfaction.

INTERDEPENDENCE OF PERSONALITY AND SATISFACTION IN COUPLES 17

Four couple studies found less convincing evidence for the importance of personality similarity in romantic relationships. Specifically, Dyrenforth et al. (2010) found that only in the Australian sample personality similarity indices (mean discrepancy, intraclass correlation with and without control for stereotype effects) were significant predictors of relationship satisfaction when actor and partner effects of personality were controlled for. The same similarity indices showed no effect in all three panel samples on life satisfaction when controlling for both partners' personalities. In the same vein, Furler et al. (2013) found no substantial similarity effects on life satisfaction in couples when actor and partner effects were taken into account—neither on the trait nor on the profile level. It is noteworthy that both studies controlled for the stereotype effect, which takes into account the general tendency of people to respond to a set of questions in a similar way (Kenny & Acitelli, 1994). Further, if perceived similarity was measured across all Big Five traits simultaneously, controlling for self-reported personality, one study suggests a small actor effect for similarity on relationship satisfaction (Furler et al., 2014). Finally, research of Hudson and Fraley (2014) tested the linear and quadratic association between personality similarity and satisfaction while controlling for main effects of self-reported personality. Their findings suggest a linear and significant relationship between trait-specific similarity for agreeableness and relationship satisfaction and a quadratic relationship between similarity on neuroticism and relationship satisfaction with moderate neuroticism similarity being optimal for relationship satisfaction (Hudson & Fraley, 2014).

Discussion

Earlier evidence suggests an inconsistent picture of the importance of personality similarity. However, more recent studies, controlling for main effects in personality, found only weak evidence for the relevance of personality similarity. Two couple studies have additionally controlled for the stereotype effect. In one study controlling for the general tendency of

INTERDEPENDENCE OF PERSONALITY AND SATISFACTION IN COUPLES 18

answering questions found a difference in the effects (Dyrenforth et al., 2010), whereas another study found no evidence for a stereotype effect in their data (Furley et al., 2013).

The study of Hudson and Fraley (2014) has additionally looked at attachment as a possible moderator and suggests that individuals with a preoccupied attachment style were most satisfied with their relationship when their partner was either very similar or dissimilar in personality. In contrast, individuals with a dismissing attachment representation benefitted most from a moderate similarity level with the partner (Hudson & Fraley, 2014). It is thus important to investigate further moderators, such as personality itself, to comprehend personality similarity's differential impact on satisfaction.

Finally, difference scores or profile similarities might not be the best method to address the question of the "best fit" due to a lack of power to detect substantial effects and the linear assumption of relationships. A promising method to address this methodological shortcoming is polynomial regression analyses that take nonlinearity into account (Damian, Su, Shanahan, Trautwein, & Roberts, 2014; Koppensteiner & Stephan, 2014).

General Discussion

The study of Big Five traits and couple satisfaction using a dyadic approach is relevant but nowhere near exhausted. Self-reported as well as partner-perceived personality plays an important role in predicting couple satisfaction, whereas the effect of similarity with regard to personality seems, at best, to be small. Since personality is more a distal factor to an intimate relationship, acting as vulnerability or strength (Karney & Bradbury, 1995), it may advance the field to address the question of which emotional, cognitive, and behavioral processes lie in between personality and relationship outcomes and whether these processes explain intra- and interpersonal effects of personality and relationship outcomes. Few studies have explored the mechanism by which distal factors, such as personality traits, influence proximal factors that explain relationship outcomes. One study has found that individuals high in neuroticism tend

INTERDEPENDENCE OF PERSONALITY AND SATISFACTION IN COUPLES 19

to more negatively interpret relationship situations that are ambiguous, which, in turn, affects both partners' relationship satisfaction (Finn et al., 2013). We believe that the testing of proximal processes is of paramount importance for a better understanding of how relationship outcomes are affected by more distal variables. Moreover, not only mediating but also moderating variables need to be included in personality studies on couple satisfaction (Kenny & Cook, 1999). A recent study for instance found that the negative association between neuroticism and relationship satisfaction can be attenuated by the frequency of sex romantic partners report (Russell & McNulty, 2011). In addition, gender as possible moderator needs to be included to illuminate differential associations between personality and satisfaction of romantic partners. Future research should also take a closer look at couples differing in the stage of their life cycle and living situations. Except for panel studies and study samples from the CoDiP study (Furler et al., 2014; Schaffhuser, Allemand, et al., 2014) studies did not include couples from old adulthood (older than 65) although evidence from personality development research demonstrates that personality changes across the whole life span (Roberts, Walton, & Viechtbauer, 2006). Some personality traits in younger years could be more crucial than in older years, where job and family demands change or disappear. Additionally, not only age but also relationship length and type might play a relevant moderating role. Letzring and Nofle (2010) compared married, cohabiting and dating couples and found differential effects. This result emphasizes the importance of comparing couple types and relationship lengths to establish knowledge on the potential differential impact of personality on couple satisfaction.

Another aspect discussed in the literature is the reciprocal effect between personality and satisfaction. Recent studies suggest that satisfaction is not only an outcome but also a predictor of personality change (Soto, 2015). In this regard, Mund and Neyer (2014) suggested that personality within romantic relationships and the reciprocal link between personality and relationship satisfaction should not only be examined on trait level (higher

INTERDEPENDENCE OF PERSONALITY AND SATISFACTION IN COUPLES 20

order factors, e.g. conscientiousness and extraversion) but also on the facet level (lower order facets, e.g. orderliness and warmth) to detect changes (Mund & Neyer, 2014).

Only little longitudinal evidence exists that link Big Five traits to relationship outcomes prospectively in a dyadic approach (Schaffhuser, Wagner, Lüdtkke, & Allemand, 2014; Slatcher & Vazire, 2009; Solomon & Jackson, 2014). Using prospective longitudinal data from dyads would allow researchers to address the question of whether the partners' personality, partner-perceived personality, and personality similarity has long-term consequences for satisfaction. Interpreting and ascribing importance to exclusive cross-sectional results is critical because the development of personality, partner perception, and personality similarity and their possible bidirectional links to relationship well-being need to be investigated. Roberts et al. (2006) argue that even small personality change can substantially impact contingent outcomes. Thus, it would be interesting to examine co-development in personality longitudinally in romantic couples. Moreover, couples develop within a certain context and thus we urge researchers to consider possible third variables that additionally affect romantic couples, such as children, work, living situation, relationship duration, and extended family and friends, as well as socio-economic status.

According to Cuperman and Ickes (2009) "work on the predictive utility of the Big Five dimensions is still in its infancy" (p. 668). We feel that this is especially true in couple research when employing a dyadic approach. We are aware that only few studies have been conducted so far that included all Big Five traits and couple satisfaction using methods assessing actor and partner effects. Nevertheless, studying personality in romantic relationships is crucial to understand the intra- and interpersonal associations of satisfaction in intimate bonds.

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INTERDEPENDENCE OF PERSONALITY AND SATISFACTION IN COUPLES 31

Footnotes

¹For our literature search on peer-reviewed journal articles, we used the database psycINFO and used terms for personality, couple and APIM. The following terms were used for personality: *Big Five*, *personality*, *Five Factor personality model*, *personality traits*, *personality*. To find couple studies we used the terms *romantic relationships*, *couples*, *relationship satisfaction*, *relationship quality*, *marriage*, *life satisfaction*. And to explicitly find couple studies using dyadic data we included the terms *actor-partner interdependence models*, *dyads*, *actor partner effects*. We did not include other personality concepts such as the Big Three or personality disorders. Finally, we checked whether the chosen studies cited articles that were not yet included or were cited from articles that could be included.

INTERDEPENDENCE OF PERSONALITY AND SATISFACTION IN COUPLES

32

		Actor effect	
		Significant	Not Significant
Partner effect	Sign.	Mixed	Dependence
	Not Sign.	Independence	Un-relatedness

Figure 1. : Classification of the combination of actor and partner effects in dyadic research

(adapted from Ledermann, Rudaz, & Grob, in press)

Table 1. Result patterns of studies examining self-reported Big Five traits and satisfaction in couples employing an Actor-Partner

Interdependence Model

Trait	Mixed		Independence		Dependence		Unrelatedness	
	female	male	female	male	female	male	female	male
Neuroticism	abcdefgjn	abcdefgjn	hkm	hkm				
Agreeableness	abcdefgjn	abcdefgijkn	ihm	hm				
Conscientiousness	bcddefgn	bcddefgn	ahjk	ahjk			lm	ilm
Extraversion	abdfgj	abdfgj	cen	cen			hiklm	hiklm
Openness	bfn	bf	cdeg	cdeg	ik	k	hjlhm	hjlhm

INTERDEPENDENCE OF PERSONALITY AND SATISFACTION IN COUPLES

34

Table 1 *continued*

Label	Study	Outcome	Sample	<i>N</i> _{couples}	<i>M</i> age	married	covariates
a)	Barelds, 2005	Marital Quality (DRQ)	Community sample, Netherlands	282	47.0	87%	relationship length
b)	Dyrenforth et al., 2010	Relationship Satisfaction (1 item)	HILDA	2,639	f: 48.5 m: 51.0	100%	
c)	Dyrenforth et al., 2010	Relationship Satisfaction (1 item)	BHPS	3,277	f: 49.4 m: 51.7	100%	
d)	Dyrenforth et al., 2010	Life Satisfaction (1 item)	HILDA	2,639	see above	see above	
e)	Dyrenforth et al., 2010	Life Satisfaction (1 item)	BHPS	3,277	see above	see above	
f)	Dyrenforth et al., 2010	Life Satisfaction (1 item)	GSOEP	5,709	f: 51.0 m: 53.7	100%	
g)	Furler et al., 2013	Life Satisfaction (1 item)	SHP	1,608	f: 49.1 m: 51.9	85%	
h)	Furler et al., 2014	Relationship Satisfaction (RAS)	CoDiP	237	f: 48.4 m: 50.7	70%	
i)	Neyer & Voigt, 2004	Relationship Satisfaction (RAS)	Community sample, Germany	100	24.5	8%	
j)	Orth, 2013	Relationship Satisfaction (DAS)	My Partner and I	186	f: 27.7 m: 30.4	20%	
k)	Schaffhuser et al., 2014	Relationship Satisfaction (RAS)	CoDiP	216	48.4	69%	age, relationship duration
l)	Slatcher & Vazire, 2009	Relationship Satisfaction (RAS)	Community sample, USA	60	20.8	0%	
m)	Slatcher & Vazire, 2009	Relationship Satisfaction (RAS)	Student sample, USA	68	19.04	0%	
n)	Solomon & Jackson, 2014	Relationship Satisfaction (1 item)	HILDA	4,103	49.8/39.2/35.8	81.1%	various demographic variables, other Big Five traits,

Note. Neuroticism and Emotional Stability are used interchangeably. Barelds (2005) used autonomy instead of openness, thus we excluded that result, although it displayed a mixed dependence pattern. RAS = Relationship Assessment Scale; DRQ = Dutch Relationship Questionnaire; HILDA = Household Income and Labour Dynamics in Australia; BHPS = British Household Panel Study; GSOEP = German Socio-Economic Panel Study; SHP = Swiss Household Panel; CoDiP = Co-Development in Personality Study. If mean ages were available for both sexes, they are reported for female (f) and male (m) participants, respectively. Solomon & Jackson (2014) reported mean ages for married, same-sex and opposite-sex de facto relationships.

APPENDIX B: Article 2

Weidmann, R., Schönbrodt, F., Ledermann, T., & Grob, A. Concurrent and longitudinal dyadic polynomial regression analyses of Big Five traits, self-esteem, goals, and relationship satisfaction: Does similarity matter? *Manuscript submitted for publication to Personality and Social Psychology Bulletin.*

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BIG FIVE TRAITS, SELF-ESTEEM, GOALS, AND SATISFACTION IN COUPLES 1

Concurrent and longitudinal dyadic polynomial regression analyses of Big Five traits, self-esteem, goals, and relationship satisfaction: Does similarity matter?

Rebekka Weidmann

University of Basel

Felix D. Schönbrodt

Ludwig-Maximilians-Universität München

Thomas Ledermann

Utah State University

Alexander Grob

University of Basel

Author Note

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Correspondence concerning this article should be addressed to Rebekka Weidmann, Department of Psychology, University of Basel, Missionsstrasse 62, 4055 Basel, Switzerland.

E-mail: rebekka.weidmann@unibas.ch

BIG FIVE TRAITS, SELF-ESTEEM, GOALS, AND SATISFACTION IN COUPLES 2

Abstract

Being with a well-matched partner seems essential for most individuals. The present study examines similarity of romantic partners' Big Five traits, self-esteem, and goals and relationship satisfaction. Data of 237 heterosexual couples, of which 141 participated again two years later, were analyzed using dyadic polynomial regression and response surface analyses. The results suggest that beyond actor and partner effects, similarity plays only a small role in satisfaction. Cross-sectional actor effects emerged for agreeableness, conscientiousness, intrinsic goals, and females' neuroticism and self-esteem whereas partner effects emerged for neuroticism, agreeableness, openness, intrinsic goals, and for females' self-esteem. Longitudinally, agreeableness predicted later relationship satisfaction (actor effect). Additionally, high male relationship satisfaction resulted if both partners reported similar low or high neuroticism levels. Moreover, women were most satisfied with their relationship if partners were modestly open. In sum, above actor and partner effects, only little evidence for similarity effects emerged.

Word count: 146

Keywords: Big Five, Self-Esteem, Goals, Relationship Satisfaction, Dyadic Polynomial Regression Analysis

BIG FIVE TRAITS, SELF-ESTEEM, GOALS, AND SATISFACTION IN COUPLES 3

Concurrent and longitudinal dyadic polynomial regression analyses of Big Five traits, self-esteem, goals, and relationship satisfaction: Does similarity matter?

“We’re all a little weird. And life is a little weird. And when we find someone whose weirdness is compatible with ours, we join up with them and fall into mutually satisfying weirdness — and call it love — true love.” Robert Fulghum

Finding a well-matched partner seems to represent a premise for satisfying romantic relationships. With regard to personality, research has not yielded a clear answer whether the similarity between romantic partners plays an important role in achieving a satisfying relationship (for a review, see Weidmann, Ledermann, & Grob, in press). The methods typically used in past research to study partners’ similarity may not be able to provide the best answer to the question of whether the similarity of two persons matters for their satisfaction with the relationship. In addition, studies have rarely investigated partners’ similarity of characteristic adaptations of personality in addition to broad dispositions to scrutinize their distinct impact on satisfaction in couples. The aim of the current study is to test the impact of similarity in couples using dyadic polynomial regressions and response surface parameters to examine whether similarity or dissimilarity of personality traits, self-esteem, and goals predict relationship satisfaction concurrently and over a time span of two years.

Associations between Personality and Satisfaction

A vast body of research has addressed the link between personality traits and relationship outcomes (Cooper & Sheldon, 2002; Weidmann et al., in press). Personality reflects an enduring vulnerability in romantic relationships potentially impeding the adaption to stress Karney and Bradbury (1995). Empirical evidence sustains Karney and Bradbury’s Vulnerability-Stress-Adaptation Model (1995), indicating substantial actor (intrapersonal) and partner (interpersonal) effects between neuroticism, agreeableness and conscientiousness and satisfaction in couples (Weidmann et al., in press). Some evidence corroborates a positive link

BIG FIVE TRAITS, SELF-ESTEEM, GOALS, AND SATISFACTION IN COUPLES 4

between extraversion and openness to experience in predicting partners' life and relationship satisfaction (Dyrenforth, Kashy, Donnellan, & Lucas, 2010; Furler, Gomez, & Grob, 2013), whereas others do not find such associations (Furler, Gomez, & Grob, 2014; Slatcher & Vazire, 2009). In addition, longitudinal evidence indicates that personality has the power to predict future levels of relationship satisfaction (Karney & Bradbury, 1995; Schaffhuser, Wagner, Lüdtke, & Allemand, 2014; Solomon & Jackson, 2014). More specifically, neuroticism predicted lower levels of satisfaction, whereas extraversion, agreeableness, and conscientiousness predicted higher levels of satisfaction. These results suggest that being low in neuroticism and high in agreeableness, conscientiousness, and extraversion is beneficial for one's own relationship satisfaction as well as the relationship satisfaction of the partner over time. However, results are contradictory for openness to experience (Karney & Bradbury, 1995; Mund & Neyer, 2014; Solomon & Jackson, 2014).

The personality of an individual not only is comprised of stable personality traits, such as the Big Five traits but, as pointed out by McAdams and Pals (2006), is a multi-layered construct with stable and more malleable characteristics (McAdams, 1994). The first layer of McAdams' personality model consists of broad dispositions such as the Big Five traits whereas the second layer encompasses characteristic adaptations such as self-esteem and goals. These two layers have also been referred to as core and surface characteristics (Kandler, Zimmermann, & McAdams, 2014). In order to take a more integrative look at personality similarity effects in romantic relationships, it is relevant to include surface characteristics to shed light on the distinct contribution of similarity in different personality domains to relationship outcomes (Gaunt, 2006). Above and beyond Big Five traits, our study examines two surface characteristics, namely self-esteem and goals, which represent relevant factors in the context of romantic couples. In the following, the theoretical groundwork and evidence on the association of self-esteem and goals on relationship outcomes will be presented.

BIG FIVE TRAITS, SELF-ESTEEM, GOALS, AND SATISFACTION IN COUPLES 5

Self-esteem has emerged as a valid predictor of satisfaction in romantic relationships (Erol & Orth, 2013; Murray, Holmes, & Griffin, 2000; Robinson & Cameron, 2012). From a theoretical standpoint, three theories guide the assumption that social relationships and self-esteem are interconnected. First, sociometer theory posits that the experience of social acceptance and rejection in desirable groups is depicted in the person's self-esteem. In other words, self-esteem increases and decreases as a function of feeling socially included (Leary & Baumeister, 2000). Second, self-broadcasting theory hypothesizes that self-esteem may be a valuable characteristic in social interactions leading to social acceptance (Srivastava & Beer, 2005). Finally and specifically for the context of romantic relationships, the risk-regulation framework offers an explanation of why self-esteem and relationship quality are closely connected (Murray, Holmes, & Collins, 2006; Murray et al., 2000). People regulate the closeness to their romantic partner depending on the degree to which they feel positively regarded by their partners and hence feel more or less likely at risk of getting hurt or rejected by the partner. Research demonstrates that self-esteem plays a crucial part in the perception of the partner's regard and love (Murray et al., 2000; Murray, Holmes, Griffin, Bellavia, & Rose, 2001). Individuals with low self-esteem more readily perceive that the partner sees them negatively, thus they feel at risk of getting hurt and distance themselves from the partner, which results in lower relationship satisfaction (Murray et al., 2000).

Empirical evidence corroborates the outlined theoretical assumptions demonstrating that higher self-esteem is associated with one's own and the partner's relationship satisfaction (Arranz Becker, 2013; Barelds, 2005; Erol & Orth, 2013; Robinson & Cameron, 2012; Sciangula & Morry, 2009). Further, self-esteem also predicted relationship satisfaction longitudinally (Orth, Robins, & Widaman, 2012), change in relationship satisfaction over time (Erol & Orth, 2014), and relationship dissolution (Arranz Becker, 2013). Finally, individual and dyadic results reveal that "self-esteem and relationship satisfaction share a common developmental dynamic" demonstrating that self-esteem and relationship satisfaction

BIG FIVE TRAITS, SELF-ESTEEM, GOALS, AND SATISFACTION IN COUPLES 6

affect each other over time (Mund, Finn, Hagemeyer, Zimmermann, & Neyer, 2015, p. 240).

Thus, results indicate that not only how a person sees herself or himself (personality traits) but also how a person estimates his or her own worth (self-esteem) is crucial for relationship satisfaction.

Goals and motivation also play a crucial role in understanding satisfaction in couples (Fowers & Owenz, 2010). Goal pursuit most often takes place in the context of social relationships, reflecting an interdependent endeavor (Fitzsimons & vanDellen, 2015). Furthermore, the theory of transactive goal dynamics defines not the individual but the relationship as regulatory unit of goal pursuit (Fitzsimons, Finkel, & vanDellen, 2015), arguing that if partners' goals are strongly linked, mutual goal achievement impacts relationship outcomes, such as stability.

Self-determination theory suggests that the fulfillment of basic needs — including affiliation, competence, and autonomy — enhances well-being (Deci & Ryan, 2000). According to self-determination theory, basic human needs are most likely satisfied when individuals strive towards intrinsic goals, encompassing self-growth, community, and meaningful relationships. In contrast, extrinsic goals comprising fame, wealth, and image are expected to be unable to satisfy basic needs and therefore are not associated with well-being in the long run (Sheldon & Kasser, 1998) or are linked to decreased well-being, such as lower vitality, self-actualization, and more physical symptoms (Kasser & Ryan, 1996).

In the context of romantic relationships, goal importance of one partner might on the one hand influence his or her own satisfaction with life in general but also with the relationship. On the other hand, a person's goal importance might also impact the partner's satisfaction. Theoretical assumptions and evidence of the Michelangelo phenomenon suggests that partners help each other to achieve their ideal selves (Rusbult, Finkel, & Kumashiro, 2009; Rusbult, Kumashiro, Kubacka, & Finkel, 2009) and losing a partner due to break-up seems detrimental for goal progress (Gomillion, Murray, & Lamarche, 2015). Further,

BIG FIVE TRAITS, SELF-ESTEEM, GOALS, AND SATISFACTION IN COUPLES 7

evidence suggests that increased importance of intrinsic life goals, such as wanting to be in a romantic relationships or having children, is positively linked to both partners' relationship satisfaction. On the other hand, extrinsic life goals, such as career, were negatively associated with relationship satisfaction (Arranz Becker, 2013).

The presented evidence on personality traits, self-esteem, and goal importance indicates that actor and partner effects allow focusing on both partners' individual contribution to couple satisfaction. In addition, researchers have also tested whether the combination of both partners' personality jointly impacts relationship satisfaction. In the following, theoretical underpinnings and empirical evidence will be reviewed concerning similarity in Big Five traits, self-esteem, and goals and their association with relationship outcomes.

Similarity in Big Five traits

From a theoretical perspective, Big Five trait similarity reflects an important component in relationship quality and could lead to decreased conflict in romantic relationships and thus avert eventual relationship dissolution (Rammstedt, Spinath, Richter, & Schupp, 2013). Being similar to the romantic partner can be beneficial because partners might experience comparable emotional involvement and perception in their relationship and, thus, be more attuned in coordinating their interactions and thoughts (Anderson, Keltner, & John, 2003). Moreover, intimate feelings, validation, and understanding can be fostered through similarity (Reis & Shaver, 1988). It has therefore been suggested that relationship satisfaction and commitment "may have less to do with either person's personality, and more to do with the particular way in which the partners' personalities mesh" (Robinson & Cameron, 2012, p. 227).

Previous research used several methods to operationalize the concept of similarity. These include difference scores (i.e., directed differences; e.g., male–female); discrepancy score (i.e., absolute or squared differences; e.g., |male–female|, or (male–female)²) profile

BIG FIVE TRAITS, SELF-ESTEEM, GOALS, AND SATISFACTION IN COUPLES 8

correlations across multiple personality dimensions, or multiplicative interactions along with the main effects (i.e., a moderated regression approach). These different measurement methods all refer to different aspects of similarity and do not test the same hypotheses. Similarity hypotheses in a more specific sense refer to the similarity of partners on a single dimension (Edwards, 2002). None of the above-mentioned analytical approaches are adequate to test the similarity hypothesis. Nevertheless, in our literature review we subsume all variants under the broader concept of similarity.

For the importance of similarity with regard to relationship satisfaction; however, empirical evidence for this notion is mixed. One study examining two large representative samples from Australia and the United Kingdom yielded some evidence for personality similarity on relationship satisfaction above and beyond actor and partner effects (Dyrenforth et al., 2010). More specifically, for the panel data from Australia, similarity in the form of absolute difference scores significantly predicted relationship satisfaction for extraversion and openness. For the panel data from the UK, only differences in emotional stability were predictive for relationship satisfaction (Dyrenforth et al., 2010). Decuyper, De Bolle, and De Fruyt (2012) used profile similarity and found that Big Five traits similarity predicted relationship satisfaction, but mostly in women. Barelds (2005) used difference scores to predict relationship quality and found that partners' difference in agreeableness had a negative effect. Finally, Luo and Klohnen (2005) tested the effect of profile similarity and difference scores on Big Five traits on observed and self-reported marital quality of both partners. The results show effects in particular for agreeableness and openness for both partners' relationship quality, reflecting that if both partners were more similarly agreeable and open, they reported and were observed to have higher relationship quality. In addition, gender-specific effects emerged that demonstrated the role of neuroticism similarity for female relationship quality and conscientiousness similarity for male relationship quality (Luo & Klohnen, 2005).

BIG FIVE TRAITS, SELF-ESTEEM, GOALS, AND SATISFACTION IN COUPLES 9

Beyond absolute and directed difference scores, researchers also addressed the role of similarity for partners' satisfaction by using product interaction terms of both partners' personality (i.e., a moderated regression approach). One study suggests that the link between extraversion and marital quality was strongest when one partner's extraversion was low (Barelds, 2005). For agreeableness, the opposite emerged: The positive actor effect between agreeableness and marital quality was only significant when the partner's level of agreeableness was high (Barelds, 2005). In contrast, results with a large representative sample from Australia tested interaction effects above and beyond linear actor and partner effects and found no same-trait significant interaction predicting relationship satisfaction (Solomon & Jackson, 2014). In sum, even though some evidence on similarity effects — in the form of difference scores, profile correlations, or interaction terms — exists for some personality dimensions, the evidence is mixed. We therefore try to test the similarity hypothesis with a different operationalization in order to clarify the importance of similarity in Big Five traits.

Similarity in Self-Esteem

With regard to the role played by similarity of partners' self-esteem, theoretical assumptions posit that self-esteem similarity may enhance feelings of empathy between romantic partners, which, in turn, fuels more satisfying interactions (Erol & Orth, 2014). Further, self-esteem has been found to be closely related to how people perceive their partner (Murray, Holmes, & Griffin, 1996b) and see themselves through the partner's eyes (Murray et al., 2000). Thus, if both partners have high self-esteem, their regard for each other and for themselves through the partner's eyes will be increased. Moreover, positive partner perception is associated with relationship satisfaction because partners may uphold positive illusions in the face of doubt and negative interactions (Murray, Holmes, & Griffin, 1996a). Positive perceived regard (or seeing oneself positively through the partner's eyes) is essential for satisfying relationships (Murray et al., 2000). Hence, self-esteem similarity with both partners showing high self-esteem could foster each partner's relationship satisfaction because

BIG FIVE TRAITS, SELF-ESTEEM, GOALS, AND SATISFACTION IN COUPLES 10

they see each other in an equally favorable light; however, low self-esteem in both partners very likely entails a detrimental effect for satisfaction. Therefore, these theories pertain to an additive main effect, rather than to a pure similarity effect.

Further, self-esteem is connected to social dominance. Interpersonal theory ascribes benefits in showing complementarity in the dominance–submissiveness dimension in order to enhance comfortable and secure interactions (Carson, 1969). It can be therefore argued that similarity in self-esteem on a high level might impede relationship satisfaction due to the conquering traits of both partners. In this vein, dissimilarity is expected to yield to high relationship satisfaction. Alternatively, it might be that the benefits and disadvantages of being similar with regard to self-esteem cancel each other out, leading to no effect (Erol & Orth, 2014).

In line with these competing theoretical assumptions, little evidence suggests difference scores or interaction effects of self-esteem. One study, for instance, reported a small, but significant negative effect between the difference score of both partners' self-esteem and marital quality signifying that if partners were dissimilar in terms of their self-esteem levels, they reported lower relationship satisfaction. In addition, they also tested the interaction effects, resulting in a small, but significant effect between both partners' self-esteem and marital quality indicating that the link between one person's self-esteem and relationship quality was strongest when the partner reported high self-esteem (Barelds, 2005). Another study found no interaction and difference score effects of both partners' self-esteem on relationship satisfaction (Robinson & Cameron, 2012). Similarly, one study using data from a large couple sample found no significant profile similarity effects for self-esteem above and beyond actor and partner effects predicting satisfaction and relationship dissolution (Arrànz Becker, 2013). In the same vein, Erol and Orth (2014) investigated whether the directed difference score in self-esteem would predict the development of relationship

BIG FIVE TRAITS, SELF-ESTEEM, GOALS, AND SATISFACTION IN COUPLES 11

satisfaction. With two large samples, no similarity effects for self-esteem were found. Thus, the majority of results demonstrate no evidence for similarity effects of self-esteem.

Similarity in Goals

The suggestion that goal similarity is linked to satisfaction in couples seems intuitive. The transactive self-regulation model posits that goal pursuit is mostly embedded in relationships and thus reflects a self-regulation system shared between relationship partners (Fitzsimons & vanDellen, 2015). Further, it links both partners' individual goal pursuit and goal outcomes with relationship properties, such as relationship satisfaction. If both partners pursue similar goals, it is easier to coordinate the outcomes leading to increased well-being (Gere, Schimmack, Pinkus, & Lockwood, 2011) and the limited resources used benefit both partners' goal pursuit (Fitzsimons & vanDellen, 2015). The recently published theory of transactive goal dynamics states that a couple represents a self-regulatory system that impedes or enhances goal achievement depending on whether partners share goal representations and coordinate their goals (Fitzsimons et al., 2015). Goal similarity can thus lead partners to invest in shared activities and interests (Cole & Teboul, 2004) rather than working on their goals individually, which might result in increased conflict, blocking, and obstructing the partner's goals (Fitzsimons & vanDellen, 2015), or sacrificing the goal for the partner (Gere et al., 2011). Sharing goals could also be associated with increased mutual goal knowledge that is, in turn, linked to increased satisfaction and feelings of closeness (Riediger & Rauters, 2010). Moreover, similar goals could foster more goal support from one's partner because both partners act in concert and might honor each other's dreams more fully due to their increased understanding of them (Carrère & Gottman, 1999). In addition, close others who prove instrumental in the goal pursuit are evaluated more positively (Fitzsimons & Shah, 2008). Therefore, goal similarity could lead one person to evaluate his or her partner and the relationship as a whole as more satisfying because individual goals are achieved more readily (Fitzsimons & Shah, 2008).

BIG FIVE TRAITS, SELF-ESTEEM, GOALS, AND SATISFACTION IN COUPLES 12

The effects of goals on well-being have mostly been studied from an intrapersonal perspective (Gere et al., 2011). Thus, we know of only little evidence linking goal similarity to romantic relationship outcomes; however, one study showed that dissimilarity in goals such as wanting to be in a couple relationship or having children was negatively associated with relationship satisfaction. Further, these concurrent results also translated into longitudinal evidence showing that dissimilarity was linked to dissolution, which was mediated by satisfaction (Arranz Becker, 2013). However, similarity concerning hobbies and social context yielded no substantial effects.

In contrast to studying single goals, the present study will focus on intrinsic and extrinsic goal aspirations as discerned in self-determination theory (Kasser & Ryan, 1996; Sheldon, Ryan, Deci, & Kasser, 2004). Intrinsic goals are in agreement with self-actualization and growth tendencies including the desire to contribute to the community, being a good parent or developing one's personality. Extrinsic goals intend to elicit reactions in the social environment by being financially successful, looking attractive or being famous (Deci & Ryan, 2000; Kasser & Ryan, 1996). This distinction of goal content is relevant because intrinsic goals more directly satisfy basic human needs such as affiliation, autonomy, and competence, whereas satisfaction of these needs is not directly ensured with extrinsic goals (Kasser & Ryan, 1993, 1996). Further, individuals' need satisfaction is linked to relational well-being, as shown by a study of Patrick, Knee, Canevello, and Lonsbary (2007) examining multiple samples. Thus, one could argue that if both partners report high intrinsic goal importance and low extrinsic goal importance, it would predict higher relationship satisfaction due to the predictive power of both partners' need satisfaction. However, this would not mean similarity, but an additive main effect of both partners' reports.

The Present Study

The present study investigates whether couples that are similar (congruent) or dissimilar (incongruent) in their Big Five personality traits, their self-esteem, and their goals

BIG FIVE TRAITS, SELF-ESTEEM, GOALS, AND SATISFACTION IN COUPLES 13

are happier with their romantic relationship. We argue that two reasons might be responsible for the inconsistent results. First, studies have used a variety of methods to examine similarity. These methods range from directed and absolute difference scores, and profile correlations, to interaction terms. Aside from other drawbacks discussed elsewhere (Edwards, 1993; Gaunt, 2006; Griffin, Murray, & Gonzalez, 1999; Nestler, Grimm, & Schönbrodt, 2015), difference scores, profile similarity, and interaction terms follow the assumption of linearity (Nestler et al., 2015). However, recent evidence corroborates the notion that for some traits moderate similarity might yield the best effect on relationship satisfaction (Hudson & Fraley, 2014). Second, most of these measures do not accurately measure the best fit, which includes whether a specific level of one partner with a specific level of the other partner predict the highest levels of satisfaction or, in other words, whether an optimal combination of both partner's variables yields the best outcome.

Therefore, "the everlasting question about who is a person's perfect match has not yet been answered satisfactorily" (Furler et al., 2013, p. 369). Hence, we address the shortcomings of past research by employing polynomial regression analyses testing for the linear, quadratic, and interactive assumption in romantic couples (Nestler et al., 2015). Further, polynomial regressions are an adequate method to clarify the question of best fit and similarity and have "more explanatory potential than do difference scores or traditional moderated regression analyses" (Shanock, Baran, Gentry, Pattison, & Heggstad, 2010, p. 543). Additionally, we will use response surface parameters and analyses to test whether similarity is linked to relationship satisfaction. Finally, we will compare simple actor-partner interdependence models (APIM) to dyadic polynomial regression models to investigate whether a simple model with only linear main effects is able to explain the association between personality and satisfaction in couples comparably well as a dyadic polynomial model.

BIG FIVE TRAITS, SELF-ESTEEM, GOALS, AND SATISFACTION IN COUPLES 14

aim to extend current literature that has worked with various similarity indices. In addition, we investigate concurrent and longitudinal associations to consider the cross-sectional association and longitudinal impact of similarity in couples. With respect to goals, few studies are available examining goal similarity for couple satisfaction. We therefore aim to extend the literature by investigating similarity effects of intrinsic and extrinsic goals in romantic couples.

Method

Participants

Dyadic data of a sample from a large-scale family study entitled *Co-Development in Personality* were used. This study aims to investigate personality development in relationships with significant others (Furler et al., 2014; Schaffhuser, Allemand, & Martin, 2014). For our cross-sectional analyses, we used data of both partners from 237 heterosexual couples. For the longitudinal analyses, 141 couples participated again 2 years after the first assessment. Participants lived in urban, suburban and rural regions of German-speaking Switzerland ($M = 48.4$ years, $SD = 19.6$ for women, and $M = 50.7$ years, $SD = 20.1$ for men, respectively). Couples had been together for an average of 23.5 years at time 1 ($SD = 17.6$) and the majority of couples were married (70.9%).

Measures

Big Five personality traits. The German version of the Big Five Inventory was used to assess the Big Five personality traits (John & Srivastava, 1999; Rammstedt & John, 2005). Participants rated their personality on 45 items on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Internal consistencies (Cronbach's alpha) for neuroticism, agreeableness, conscientiousness, extraversion, and openness to experience were .85, .71, .81, .84, and .76, respectively.

Self-esteem. The participants' self-esteem was measured with the German version of the Rosenberg Self-Esteem Scale (Rosenberg, 1965; von Collani & Herzberg, 2003). On a

BIG FIVE TRAITS, SELF-ESTEEM, GOALS, AND SATISFACTION IN COUPLES 15

four-point scale participants rated 10 items such as “I feel that I have a number of good qualities”. Cronbach’s alpha was .86.

Goals. We assessed goals using the German version of the Aspirations Index (Deci & Ryan, 1997; Klusmann, Trautwein, & Ludtke, 2005). This 28-item index measures several aspirations that were grouped into intrinsic and extrinsic goal importance. Intrinsic goals consisted of aspirations such as personal growth, relationships, community, and health. Extrinsic goals comprised goals such as wealth, fame, and image. Reliabilities were good with a Cronbach’s alpha of .80 for intrinsic goals and .87 for extrinsic goals.

Relationship satisfaction. The German version of the widely used Relationship Assessment Scale was employed to measure relationship satisfaction (Hendrick, 1988; Sander & Böcker, 1993). Seven items were rated on a five-point scale ranging from 1 (low satisfaction) to 5 (high satisfaction) on items such as “How well does your partner meet your needs?”. Alpha reliability was .91.

Statistical Approach

We built on the Actor–Partner Interdependence Model (Kenny, 1996) and employed polynomial regression analyses using the lavaan package in R (Rosseel, 2012) and full-information maximum likelihood estimation. The responses surfaces were created with the RSA package (Schönbrodt, 2016). Before the analyses, all variables were z-standardized across males and across females.

Because of the dyadic nature of our data, we followed the recommendations of Nestler et al. (2015) and tested path equation models with polynomial regressions (see Figure 1). Equation 1 and 2 describe the dyadic polynomial regression equations for both female and male partners’ relationship satisfaction (Y_f and Y_m) being predicted by partners’ personalities (X_f and X_m), their interaction term ($X_f X_m$) and quadratic terms (X_f^2 and X_m^2).

$$Y_f = b_{10} + b_{11}X_f + b_{12}X_m + b_{13}X_f X_m + b_{14}X_f^2 + b_{15}X_m^2 + e \quad (1)$$

$$Y_m = b_{20} + b_{21}X_f + b_{22}X_m + b_{23}X_f X_m + b_{24}X_f^2 + b_{25}X_m^2 + e \quad (2)$$

BIG FIVE TRAITS, SELF-ESTEEM, GOALS, AND SATISFACTION IN COUPLES 16

Insert figure 1 about here

Polynomial regressions, as mentioned above, test several coefficients: First, two linear associations (both partners' personality traits), second the interaction of both linear terms, and finally, two quadratic associations (both partners' squared personality ratings). Using these polynomial regression coefficients, we computed response surface parameters, termed a_1 , a_2 , a_3 , and a_4 . With the polynomial regression coefficients a three-dimensional response surface (RS) plot is created, which encompasses a line of congruence (LOC: $X = Y$) and a line of incongruence (LOIC: $X = -Y$). The LOC constitutes of a linear slope (a_1) and a curvilinear slope (a_2). Likewise, the LOIC is defined by a linear slope (a_3) and by a curvilinear slope (a_4) (Edwards & Parry, 1993; Schönbrodt, 2016; Shanock et al., 2010). To illustrate what these parameters mean, consider Figure 2. This RS plot displays an additive main effect reflecting a positive a_1 parameter (LOC) signifying that both partners' high ratings of their personality would result in high relationship satisfaction. Figure 3 shows a negative a_4 parameter, suggesting that if the couple partners report similar personality, independent of the level, relationship satisfaction is high.

Insert figures 2 and 3 about here

For our analyses, response surface parameters that are fueled by only one regression coefficient are not interpreted above and beyond that regression coefficient. In addition, due to the large number of models tested, we follow the procedure of past research on personality and relationships and only interpret standardized regression coefficients larger than .10 that are significant on a $p < .01$ level (Mund & Neyer, 2014; Parker, Lüdtke, Trautwein, & Roberts, 2012). For the longitudinal analyses, we additionally controlled for the stability in relationship satisfaction over time.

BIG FIVE TRAITS, SELF-ESTEEM, GOALS, AND SATISFACTION IN COUPLES 17

To examine possible gender effects within the final SEMs, we tested whether path coefficients could be set invariant for male and female. The Tucker-Lewis Index ($TLI > .90$), the comparative fit index ($CFI > .90$), and the root-mean-square error of approximation ($RMSEA < .06$) were considered for model fit examination (Hu & Bentler, 1999). Nested model comparisons (e.g., imposing gender constraints) were evaluated with the test of small difference in fit (MacCallum, Browne, & Cai, 2006), which is less sensitive to sample size than the chi-square difference test.

Power analyses

Because no power analysis tool exists for dyadic polynomial regressions, we used the program written by Ackerman and Kenny to determine the power of simple APIMs (Ackerman, Ledermann, & Kenny, 2016). Based on earlier findings on Big Five traits, self-esteem, goals, and relationship satisfaction (Arranz Becker, 2013; Dyrenforth et al., 2010; Erol & Orth, 2013; Solomon & Jackson, 2014), we assumed a small to medium actor effect (standardized estimate = .15) and a small partner effect (standardized estimate = .10). For goals, Arranz Becker (2013) found smaller effects; however, he tested specific goals and did not group the goals into intrinsic and extrinsic goals. We thus expect our effects to be small to modest in size for goals. With a sample of 237 couples, the power to detect the effects on a $p < .01$ level is .83 and .41, respectively. Unfortunately, no tool exists to analyze the power of longitudinal APIMs; however, we estimate that due to the reduced sample size, our longitudinal models are able to detect effects that are small to medium in size.

Results**Cross-sectional results**

The results of the cross-sectional dyadic polynomial regression analyses and the response surface parameters on relationship satisfaction are displayed in Table 1 for female relationship satisfaction and in Table 2 for male relationship satisfaction. On the grounds that no interaction effect or higher order coefficient term reached significance at the .01

BIG FIVE TRAITS, SELF-ESTEEM, GOALS, AND SATISFACTION IN COUPLES 18

significance level, we followed Garcia, Kenny, and Ledermann (2015) and tested whether simple APIM — by constraining all higher terms to zero — was not significantly worse than the polynomial regression models. The test of small difference in fit between the models did not yield any significant results suggesting that the simpler APIM displays the data equally well compared to the dyadic polynomial regressions (see supplemental online material for model fits of these and subsequent models). Therefore, from a concurrent perspective, above and beyond actor and partner effects, there is no evidence for similarity effects in personality traits, self-esteem, and goal importance above and beyond actor and partner effects.

Insert tables 1 and 2 about here

The actor and partner effects of the simple APIMs are shown in Table 3. Setting the paths equal for men and women yielded a good model fit ($CFI = 1.00$, $TLI \geq .99$, $RMSEA \leq .04$) and did not significantly worsen the fit ($p = .26 - .85$), except for the cross-sectional APIM with neuroticism and self-esteem. For neuroticism, only constraining partner effects yielded a good fit ($CFI = 1.00$, $TLI = 1.00$, $RMSEA < .01$), whereas for self-esteem, no paths could be constrained. In the cross-sectional models, actor effects emerged for both partners for agreeableness, conscientiousness, and intrinsic goals. Thus, if both male and female partners reported higher agreeableness, conscientiousness, and intrinsic goals, they were more satisfied with their relationship in general. Further, in women, higher neuroticism and lower self-esteem were linked with lower relationship satisfaction. In addition to actor effects, significant partner effects emerged for neuroticism, agreeableness, openness, female self-esteem, and intrinsic goals. These interpersonal associations reveal that people with a partner low on neuroticism and high on openness, agreeableness, and intrinsic goals, and with a female partner high on self-esteem report higher relationship satisfaction.

BIG FIVE TRAITS, SELF-ESTEEM, GOALS, AND SATISFACTION IN COUPLES 19

Insert table 3 about here

Longitudinal results

Tables 4 and 5 show the results for the longitudinal polynomial regression analyses. Surprisingly, significant higher-order terms emerged for openness and female relationship satisfaction, especially for the partner effect ($b = -.11, p = .004$). With regard to men's relationship satisfaction, a significant interaction term for neuroticism was found ($b = .19, p < .001$). However, because the majority of effects speak for no longitudinal effects of Big Five traits, self-esteem, and goals on relationship satisfaction two years later, we tested whether the simpler APIM could be used instead of the more complex polynomial regression models (Table 4). No significant differences were found for agreeableness, conscientiousness, extraversion, self-esteem, and both intrinsic and extrinsic goals. However, the simpler APIM for neuroticism and openness was significantly worse than the APIM with polynomial terms ($p = .01$ and $p < .01$, respectively).

Insert tables 4 and 5 about here

Figure 4 shows the predicted values of the longitudinal associations between both partners' neuroticism and male relationship satisfaction. The RS plot revealed two significant parameters, a_2 and a_4 , demonstrating that male partners are more satisfied with their relationship if both partners are either highly neurotic or very emotionally stable. Lowest relationship satisfaction was found for partners very dissimilar with regard to their neuroticism levels. For openness and female relationship satisfaction, the results revealed that if both partners reported modest openness to experience, female relationship satisfaction was high two years later (see Figure 5). In contrast, if partners were dissimilar in terms of their openness levels, female partners reported low relationship satisfaction.

BIG FIVE TRAITS, SELF-ESTEEM, GOALS, AND SATISFACTION IN COUPLES 20

Insert figures 4 and 5 about here

For the other variables, where the simple APIM was sufficient, we constrained the paths to be equal for female and male partners ($df = 4$). All model fits were good ($CFI = 1.00$, $TLI = 1.00$, $RMSEA < .01$), and the constrained models were not significantly worse than the unconstrained models ($ps > .41$). The longitudinal results for the simple APIMs are displayed in Table 4. No significant effects emerged, except an actor effect for agreeableness. Higher agreeableness predicted higher relationship satisfaction in the same person two years later. However, this effect does not exceed the benchmark we set of .10 for interpreting results.

Discussion

The current study aimed to address the similarity hypothesis concerning personality traits, self-esteem, and goals of romantic partners and their relationship satisfaction. We used cross-sectional and longitudinal data employing dyadic polynomial regressions. In general, we found only little evidence that the degree of similarity between two romantic partners plays a substantial role above and beyond linear actor and partner effects.

With regard to the concurrent results on personality traits, the results revealed actor effects for agreeableness, conscientiousness, and for females' actor effects in neuroticism. Partner effects emerged for neuroticism, agreeableness, and openness. Hence, our results suggest that low agreeableness, conscientiousness, and high neuroticism can be seen as enduring vulnerabilities for one's own and the partner's satisfaction in romantic relationships (Karney & Bradbury, 1995). Further, these results are generally in line with the majority of dyadic studies (Weidmann et al., in press). Evidence corroborates our results by showing relationship processes linking these traits to satisfaction in couples. Finn, Mitte, and Neyer (2013) found, for instance, that partners high in neuroticism negatively interpret ambiguous cues in their relationship, resulting in lower satisfaction for both partners. Further, high

BIG FIVE TRAITS, SELF-ESTEEM, GOALS, AND SATISFACTION IN COUPLES 21

agreeableness is linked to positive behaviors and perceptions in social interactions (Cuperman & Ickes, 2009), which could also enhance relationship satisfaction in couples. Despite some research emphasizing the importance of extraversion (Dyrenforth et al., 2010; Solomon & Jackson, 2014; Vater & Schröder-Abé, 2015), we found no link between extraversion and relationship satisfaction; however, the effects of extraversion were comparable in size with larger studies (Dyrenforth et al., 2010). Finally, openness to experience of one partner was negatively associated with the relationship satisfaction of the other partner. It has been theorized that openness to experience could be disadvantageous for the relationship due to diverging interests of both partners, leading partners to spend much time apart. Additionally, openness to experience can also be linked to openness toward alternative partners or infidelity (Orzeck & Lung, 2005; Solomon & Jackson, 2014); however, more studies are needed to uncover how and what aspects of openness to experience are connected to satisfaction in couples. Across the time span of two years, only agreeableness predicted one's own satisfaction. Thus, how trusting, generous, forgiving, and cooperative an individual is links to higher satisfaction two years later. Aside from this effect, we found no long-term actor and partner effects of Big Five personality traits on relationship satisfaction, in contrast to previous studies on romantic couples (Karney & Bradbury, 1995; Mund & Neyer, 2014; Schaffhuser, Allemand, et al., 2014; Solomon & Jackson, 2014).

Interestingly, the longitudinal results revealed that in the case of neuroticism and openness to experience, the dyadic polynomial regressions were better suited to predicting relationship satisfaction compared to the simpler APIMs. More specifically, men benefitted most with regard to their relationship satisfaction two years later when both partners reported either high or low neuroticism. We hypothesize that similarity on high or low levels of neuroticism might benefit men in the long-term because partners share a greater sense of emotional understanding and coordination. Why similarity was only beneficial either on the high end or the low end of neuroticism seems puzzling. However, highly neurotic and highly

BIG FIVE TRAITS, SELF-ESTEEM, GOALS, AND SATISFACTION IN COUPLES 22

emotionally stable individuals might show more predictive behavior and, thus, similarity might facilitate emotional reactions in times of stress or anxiety and therefore fuel cohesion in romantic relationships. However, these exploratory findings were not predicted and await further evidence in future studies. Furthermore, the absence of this pattern in the cross-sectional analysis raises some doubts about the robustness of effects.

For women, high relationship satisfaction emerged when both partners reported modest levels of openness. Past results of openness to experience have been contradictory with regard to relationship outcomes (Dyrenforth et al., 2010; Furler et al., 2014; Orth, 2013; Solomon & Jackson, 2014). Openness to experience could be advantageous for romantic relationships because it fuels excitement and new activities (Solomon & Jackson, 2014) although, on the other hand, openness to experience is also related to a person's infidelity (Orzeck & Lung, 2005). Our results suggest that modest levels of openness in both partners seem to be optimal for women's relationship satisfaction, which might explain previous diverging results, which employed linear models only. Notably, the simple APIM would not have been able to spot these differences, resulting in a non-significant effect. Polynomial regressions therefore helped clearer understand of these longitudinal relations. Again, it should be noted that these results were exploratory and await replication.

Aside from these two exceptions, the simple APIMs depicted the data just as well as the more complex polynomial regression models. The results affirm that above and beyond linear actor and partner effects, similarity does not seem to play a substantial role in the satisfaction in couples. However, the fact that most personality traits do not show similarity reflects the emerging tenor from studies that controlled for actor and partner effects when investigating similarity (Weidmann et al., in press).

Our evidence corroborates previous findings on the covariance of both partners' self-esteem in relationship satisfaction (Erol & Orth, 2013; Robinson & Cameron, 2012), at least cross-sectionally. In the context of romantic relationships, they might be explained by the risk

BIG FIVE TRAITS, SELF-ESTEEM, GOALS, AND SATISFACTION IN COUPLES 23

regulation framework postulating that due to their low self-esteem, individuals might protect themselves against the risk of being hurt because of their negative perceived regard. Consequently, they perceive their partner and their relationship more negatively (Murray et al., 2006; Murray et al., 2000), however, these effects only emerged for women. Women's self-esteem was associated with both partners' relationship satisfaction. This sex difference is not in line with the majority of studies (e.g., Erol & Orth, 2013; Murray et al., 2000; Robinson & Cameron, 2012). In addition, self-esteem did not longitudinally predict relationship satisfaction in the current study, contradicting evidence indicating that self-esteem is an important longitudinal predictor of relevant life outcomes, including relationship satisfaction (Erol & Orth, 2014; Orth et al., 2012). Thus, with regard to the longitudinal results, the current evidence does not confirm self-broadcasting theory postulated by Srivastava and Beer (2005).

We did not find any similarity effects for self-esteem, as the APIM was equally good in fit compared to the polynomial regression model. These results are in line with current research suggesting that self-esteem similarity does not play a role in predicting relationship satisfaction (Erol & Orth, 2013). It could thus be that the advantages and disadvantages of having similar self-esteem might even each other out (Erol & Orth, 2013) or that no substantial effect exists.

With regard to goals, it has been argued that intrinsic goals enhance the satisfaction of basic needs (Kasser & Ryan, 1996; Sheldon & Kasser, 1998). Our evidence showed that both partners' intrinsic goal importance was concurrently linked to relationship satisfaction, which is in line with self-determination theory (Deci & Ryan, 2000) and current evidence (Arranz Becker, 2013). The pursuit of intrinsic goals seems to benefit not only one's own satisfaction with the relationship, but also the partner's. On the one hand, intrinsic goals could be tied directly to relationship satisfaction because these goals include relationships and the family. On the other hand, intrinsic goals also included themes such as health, community, and

BIG FIVE TRAITS, SELF-ESTEEM, GOALS, AND SATISFACTION IN COUPLES 24

personal growth. These goals might improve a person's life satisfaction, which is closely tied to relationship quality (Gustavson, Røysamb, Borren, Torvik, & Karevold, 2016). However, no longitudinal effects emerged across a time span of two years. Therefore, goal importance might yield more short-term benefits for romantic couples.

Extrinsic goals yielded no significant concurrent effects on relationship satisfaction. It might be the case that extrinsic goals bear benefits and impediments for a romantic couple. On the one hand, one partner could benefit from work and wealth goals of the partner, which might enable more intrinsic goals such as personal growth through travelling, courses, and visiting family. On the other hand, however, the time and resources invested in extrinsic goals shift the focus away from the romantic relationship, which might lead to lower relationship satisfaction. The non-significant longitudinal associations replicated the concurrent results and are in line with research on extrinsic goals and general well-being (Sheldon & Kasser, 1998).

In contrast to Arrànz Becker (2013), we found no congruence effects of goals on relationship satisfaction. The instruments used by Arrànz Becker (2013) to measure intrinsic goals differed from our measure insofar as goals such as being in a couple relationship or having children are directly tied to the current romantic relationship. Our study examined intrinsic goals more broadly, reflecting goals less proximal to the relationship, and could not confirm the intuitive expectation that goal similarity is predictive of satisfaction in romantic partners. Thus, future studies are needed to replicate the current evidence.

However, evidence suggests that perceived rather than actual goal similarity is related to relationship quality, mediated through perceived goal progress (Avivi, Laurenceau, & Carver, 2009). These aspects need to be considered in future research to gain a clearer picture of the importance of goals in romantic couples. Transactive goal dynamics theory posits that for the longevity of the relationship, both partners not only need to have substantial goal overlap but also need to agree on how these goals can be achieved and successfully

BIG FIVE TRAITS, SELF-ESTEEM, GOALS, AND SATISFACTION IN COUPLES 25

coordinate their goal pursuit (Fitzsimons et al., 2015). Thus, such moderating factors might further contribute to the understanding of how partners' goals are linked to relationship outcomes.

In line with previous studies, the effects found for the APIMs with Big Five traits and goals were small in size, whereas the effects for self-esteem were small to medium (e.g., Arrànz Becker, 2013; Dyrenforth et al., 2010; Erol & Orth, 2013).

The study's results need to be considered in the light of some limitations. First, we solely relied upon self-reports, which might be biased by social desirability, especially when reporting one's own self-esteem (Robins, Tracy, Trzesniewski, Potter, & Gosling, 2001). Therefore, future research should complement self-reports with reports of informants, such as romantic partners (Vazire, 2006). Second, our sample is culturally homogenous as only Swiss couples were surveyed. Cross-cultural studies are needed to test the robustness of effects across various countries and cultures. Although Big Five traits are consistently found across different cultures (McCrae & Costa, 1997), the effects of personality traits might differ across cultures. The same might be true for self-esteem, intrinsic, and extrinsic goals. Extrinsic goals seem more present in Western cultures and therefore represent a vigorously strived-for ideal (Kasser & Ryan, 1996).

Further investigations might focus not on actual but rather on perceived similarity in romantic couples (Iafrate, Bertoni, Margola, Cigoli, & Acitelli, 2012; Tidwell, Eastwick, & Finkel, 2013). Moreover, evidence suggests important moderating and mediating factors explaining the association between personality characteristics and satisfaction in couples (Avivi et al., 2009; Erol & Orth, 2013; Hudson & Fraley, 2014), for instance the importance ratings of similarity on specific personality characteristics (Lutz-Zois, Bradley, Mihalik, & Moorman-Eavers, 2006).

In conclusion, the current study is one of the first to investigate the role of similarity between romantic partners' personality traits, self-esteem, and goals on relationship

BIG FIVE TRAITS, SELF-ESTEEM, GOALS, AND SATISFACTION IN COUPLES 26

satisfaction using dyadic polynomial regression analysis and response surface parameters. In general, the current evidence does not confirm the assumption of a possible perfect combination of partners' personality promoting relationship satisfaction above and beyond the contribution of both partners' personality. However, future research needs to take a closer look at the longitudinal effects of neuroticism and openness and whether these effects might be better explained by polynomial regressions, rather than a simple APIM.

BIG FIVE TRAITS, SELF-ESTEEM, GOALS, AND SATISFACTION IN COUPLES 27

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Table 1
Cross-sectional dyadic polynomial regression coefficients and response surface parameters of partner's personality, self-esteem, and goals on female relationship satisfaction.

	Neuroticism	Agreeableness	Conscientious- ness	Extraversion	Openness	Self-esteem	Intrinsic Goals	Extrinsic Goals
b_1 actor rating	.04 [-.11, .19]	.20* [.03, .37]	.15* [.01, .30]	.03 [-.11, .17]	-.13 [-.29, .02]	.12 [-.04, .28]	.33*** [.18, .48]	.08 [-.08, .23]
b_2 partner rating	-.22* [-.41, -.04]	.01 [-.16, .17]	.00 [-.16, .16]	.09 [-.06, .24]	-.03 [-.17, .11]	.19* [.03, .36]	.15 [-.01, .31]	.02 [-.12, .16]
b_3 actor rating ²	-.04 [-.15, .07]	-.08 [-.16, .01]	.04 [-.06, .15]	-.03 [-.13, .07]	-.11 [-.23, .02]	.02 [-.07, .11]	-.06 [-.19, .06]	-.12 [-.24, .002]
b_4 actor rating x partner rating	.17* [.02, .32]	.05 [-.12, .21]	.03 [-.13, .18]	-.02 [-.16, .12]	.01 [-.15, .18]	-.09 [-.25, .07]	.03 [-.11, .16]	-.05 [-.22, .12]
b_5 partner rating ²	-.05 [-.19, .10]	-.02 [-.14, .10]	.02 [-.08, .12]	.09 [-.04, .22]	.01 [-.11, .13]	.13 [-.03, .29]	.04 [-.06, .14]	.04 [-.07, .15]
Response surface parameters								
a_1	-.18 [-.39, .03]	.21 [-.01, .42]	.16 [-.04, .36]	.12 [-.07, .31]	-.17 [-.35, .02]	.31** [.11, .51]	.48*** [.27, .68]	.09 [-.08, .27]
a_2	.08 [-.12, .28]	-.05 [-.26, .16]	.09 [-.10, .28]	.04 [-.14, .22]	-.09 [-.30, .13]	.06 [-.16, .28]	.01 [-.14, .14]	-.13 [-.28, .03]
a_3	.26 [-.001, .53]	.19 [-.07, .45]	.15 [-.08, .38]	-.06 [-.28, .16]	-.10 [-.33, .12]	-.08 [-.33, .17]	.18 [-.05, .41]	.06 [-.19, .30]
a_4	-.26 [-.53, .01]	-.14 [-.38, .09]	.04 [-.19, .27]	.08 [-.16, .32]	-.11 [-.37, .15]	.24 [-.03, .51]	-.05 [-.31, .21]	-.02 [-.33, .28]

Notes. Polynomial regression coefficients ($b_1 - b_5$) are unstandardized b-weights but due to the z-standardization of the variables, they can be interpreted as standardized β -weights. 95% confidence intervals are given in brackets []. Response surface parameters are computed as follows: $a_1 = b_1 + b_2$; $a_2 = b_3 + b_4 + b_5$; $a_3 = b_1 - b_2$; $a_4 = b_3 - b_4 + b_5$. † $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$

Table 2

Cross-sectional dyadic polynomial regression coefficients and response surface parameters of partner's personality, self-esteem, and goals on male relationship satisfaction.

	Neuroticism	Agreeableness	Conscientiousness	Extraversion	Openness	Self-esteem	Intrinsic Goals	Extrinsic Goals
b ₁ actor rating	-.25** [-.42, -.08]	.07 [.09, .24]	.21** [.06, .35]	.09 [.04, .23]	.03 [.10, .16]	.29*** [.14, .43]	.15* [.01, .30]	-.06 [.19, .08]
b ₂ partner rating	-.03 [.17, .10]	.23** [.06, .40]	-.05 [.18, .09]	.02 [.11, .15]	-.17* [.30, -.03]	.04 [.11, .18]	.15* [.01, .28]	.05 [.09, .19]
b ₃ actor rating ²	-.01 [.14, .12]	-.03 [.15, .09]	.00 [.09, .09]	.04 [.08, .16]	-.02 [.13, .09]	.04 [.11, .19]	-.03 [.12, .07]	.03 [.07, .13]
b ₄ actor rating x partner rating	.09 [.05, .23]	-.02 [.19, .14]	.04 [.10, .18]	.06 [.07, .18]	.02 [.12, .17]	-.06 [.21, .08]	.07 [.05, .20]	.00 [.15, .16]
b ₅ partner rating ²	-.03 [.13, .07]	-.03 [.11, .06]	.02 [.08, .11]	-.06 [.15, .03]	-.05 [.16, .07]	-.02 [.10, .07]	-.11 [.22, .01]	-.07 [.18, .04]
Response surface parameters								
a ₁	-.28** [.47, .10]	.31** [.09, .52]	.16 [.02, .34]	.11 [.06, .28]	-.14 [.30, .03]	.33*** [.14, .51]	.30** [.12, .49]	-.01 [.17, .16]
a ₂	.05 [.13, .23]	-.08 [.29, .12]	.05 [.11, .22]	.04 [.12, .20]	-.04 [.23, .15]	-.04 [.24, .16]	-.06 [.19, .07]	-.03 [.18, .11]
a ₃	-.22 [.46, .02]	-.16 [.42, .10]	.25* [.04, .56]	.07 [.13, .27]	.20 [.01, .40]	.25* [.02, .48]	.01 [.20, .21]	-.10 [.33, .12]
a ₄	-.13 [.37, .11]	-.04 [.27, .19]	-.02 [.23, .19]	-.07 [.28, .14]	-.09 [.32, .15]	.09 [.16, .33]	-.20 [.44, .04]	-.04 [.32, .24]

Notes. Polynomial regression coefficients (b₁ – b₅) are unstandardized b-weights but due to the z-standardization of the variables, they can be interpreted as standardized β-weights. 95% confidence intervals are given in brackets []. Response surface parameters are computed as follows: a₁ = b₁ + b₂; a₂ = b₃ + b₄ + b₅; a₃ = b₁ – b₂; a₄ = b₃ – b₄ + b₅. †p < .10, *p < .05, **p < .01, ***p < .001

Table 3

Cross-sectional and longitudinal results of the simple Actor-Partner Interdependence model with partners' personality, self-esteem, and goals on relationship satisfaction.

	Neuroticism	Agreeableness	Conscientiousness	Extraversion	Openness	Self-esteem	Intrinsic Goals	Extrinsic Goals
Cross-sectional models								
Actor effect	-.19** / -.05 [-.30, -.08] / [-.17, .06]	.16*** [.07, .25]	.19*** [.10, .28]	.07 [-.02, .16]	-.03 [-.12, .06]	30*** / .07 [.16, .44] / [-.06, .20]	.24*** [.15, .32]	-.01 [-.10, .08]
Partner effect	-.10* [-.18, -.01]	.15** [.06, .24]	-.02 [-.11, .07]	.04 [-.05, .13]	-.10* [-.18, -.01]	.03 / .21** [-.08, .15] / [.05, .37]	.12** [.04, .21]	.02 [-.07, .11]
Longitudinal models								
Actor effects	-.07 [†] [-.13, .002]	.07* [.003, .14]	.01 [-.06, .08]	.04 [-.03, .10]	.03 [-.04, .10]	.05 [-.02, .11]	.03 [-.04, .10]	-.01 [-.08, .06]
Partner effects	.01 [-.06, .08]	.02 [-.04, .09]	-.01 [-.07, .06]	-.03 [-.10, .03]	.04 [-.03, .11]	.03 [-.04, .10]	.00 [-.07, .07]	.02 [-.05, .09]

Notes: Regression coefficients are unstandardized b-weights but due to the z-standardization of the variables, they can be interpreted as standardized β -weights. 95% confidence intervals are given in brackets []. If two coefficients are presented, the first is associated female relationship satisfaction, and the second predicts male relationship satisfaction. Coefficients are equal for women and men's relationship satisfaction. [†] $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$

Table 4

Longitudinal dyadic polynomial regression coefficients and response surface parameters of partners' personality, self-esteem, and goals on female relationship satisfaction.

	Neuroticism	Agreeableness	Conscientiousness	Extraversion	Openness	Self-esteem	Intrinsic Goals	Extrinsic Goals
Polynomial regression coefficients								
b ₁ actor rating	-.12* [-.22, -.03]	.03 [-.07, .13]	.07 [-.04, .18]	.06 [-.05, .16]	-.01 [-.10, .09]	.11* [.003, .22]	.01 [-.10, .12]	-.03 [-.13, .07]
b ₂ partner rating	.02 [-.07, .11]	.07 [-.02, .16]	-.04 [-.15, .06]	-.06 [-.15, .04]	.05 [-.04, .14]	-.02 [-.14, .10]	.01 [-.09, .11]	-.04 [-.15, .06]
b ₃ actor rating ²	.02 [-.06, .10]	.01 [-.04, .06]	.06 [.00, .11]	-.05 [-.11, .02]	-.08* [-.15, -.01]	.03 [-.04, .09]	-.02 [-.09, .05]	-.04 [-.12, .03]
b ₄ actor rating x partner rating	.02 [-.08, .12]	.02 [-.08, .11]	.03 [-.07, .13]	.05 [-.06, .16]	.11* [.02, .21]	.02 [-.09, .12]	.05 [-.03, .14]	.10 [-.002, .19]
b ₅ partner rating ²	.03 [-.04, .11]	.05 [-.02, .11]	-.02 [-.10, .06]	-.06 [-.15, .02]	-.11** [-.19, -.04]	-.01 [-.09, .07]	-.03 [-.11, .06]	.03 [-.04, .10]
Response surface parameters								
a ₁	-.10 [-.22, .02]	.10 [-.02, .23]	.03 [-.10, .15]	.00 [-.14, .13]	.05 [-.07, .16]	.09 [-.05, .23]	.02 [-.13, .17]	-.07 [-.19, .05]
a ₂	.07 [-.05, .19]	.08 [-.04, .19]	.07 [-.03, .18]	-.06 [-.18, .05]	-.08 [-.19, .04]	.04 [-.08, .15]	.00 [-.08, .09]	.08 [-.004, .16]
a ₃	-.14 [-.29, .002]	-.03 [-.18, .11]	.12 [-.06, .29]	.11 [-.04, .26]	-.06 [-.21, .09]	.13 [-.04, .30]	.00 [-.15, .15]	.02 [-.15, .18]
a ₄	.03 [-.15, .21]	.04 [-.09, .17]	.01 [-.15, .18]	-.16 [-.34, .03]	-.30*** [-.47, -.14]	.01 [-.18, .19]	-.10 [-.27, .07]	-.11 [-.29, .07]

Notes: Polynomial regression coefficients (b₁ – b₅) are unstandardized b-weights but due to the z-standardization of the variables, they can be interpreted as standardized β-weights. 95% confidence intervals are given in brackets []. If two coefficients are presented, the first is for female relationship satisfaction, and the second corresponds to male relationship satisfaction. Only one coefficient shows the results for both partners. Response surface parameters are computed as follows: a₁ = b₁ + b₂; a₂ = b₃ + b₄ + b₅; a₃ = b₁ – b₂; a₄ = b₃ – b₄ + b₅. †p < .10, *p < .05, **p < .01, ***p < .001

Table 5

Longitudinal dyadic polynomial regression coefficients and response surface parameters of partners' personality, self-esteem, and goals on male relationship satisfaction.

	Neuroticism	Agreeableness	Conscientious- ness	Extraversion	Openness	Self-esteem	Intrinsic Goals	Extrinsic Goals
Polynomial regression coefficients								
b ₁ actor rating	.01 [-.09, .10]	.12* [.02, .22]	-.01 [-.12, .11]	-.01 [-.11, .10]	.06 [-.05, .16]	.02 [-.11, .14]	.03 [-.07, .14]	-.02 [-.13, .10]
b ₂ partner rating	-.06 [-.16, .05]	-.03 [-.14, .08]	.03 [-.09, .15]	-.04 [-.16, .08]	.02 [-.08, .13]	.07 [-.04, .19]	-.01 [-.13, .11]	.05 [-.06, .16]
b ₃ actor rating ²	.05 [-.03, .12]	.01 [-.07, .08]	-.02 [-.10, .07]	-.05 [-.14, .04]	.04 [-.05, .12]	.02 [-.07, .10]	-.08 [-.16, .01]	.06 [-.02, .13]
b ₄ actor rating x partner rating	.19*** [.08, .29]	-.02 [-.12, .08]	.04 [-.07, .15]	.01 [-.11, .13]	-.06 [-.17, .05]	-.13* [-.25, -.02]	.01 [-.08, .10]	-.01 [-.12, .10]
b ₅ partner rating ²	-.06 [-.14, .03]	-.02 [-.07, .04]	.00 [-.07, .06]	-.03 [-.11, .04]	.04 [-.04, .11]	.01 [-.06, .08]	.02 [-.06, .10]	-.01 [-.09, .08]
Response surface parameters								
a ₁	-.05 [-.18, .08]	.09 [-.05, .22]	.03 [-.11, .16]	-.05 [-.20, .10]	.08 [-.05, .20]	.09 [-.07, .24]	.03 [-.14, .19]	.03 [-.10, .17]
a ₂	.18** [.06, .30]	-.03 [-.16, .10]	.02 [-.10, .13]	-.07 [-.20, .05]	.01 [-.12, .14]	-.10 [-.23, .02]	-.05 [-.14, .05]	.04 [-.06, .13]
a ₃	.06 [-.09, .21]	.15 [-.01, .30]	-.03 [-.22, .15]	.03 [-.13, .19]	.03 [-.13, .20]	-.06 [-.24, .12]	.04 [-.12, .20]	-.07 [-.25, .11]
a ₄	-.20* [-.39, -.01]	.01 [-.13, .15]	-.06 [-.24, .12]	-.09 [-.29, .11]	.13 [-.05, .31]	.16 [-.03, .36]	-.06 [-.24, .12]	.06 [-.14, .26]

Notes: Polynomial regression coefficients (b₁ – b₅) are unstandardized b-weights but due to the z-standardization of the variables, they can be interpreted as standardized β -weights. 95% confidence intervals are given in brackets []. If two coefficients are presented, the first is for female relationship satisfaction, and the second corresponds to male relationship satisfaction. Only one coefficient shows the results for both partners. Response surface parameters are computed as follows: a₁ = b₁ + b₂; a₂ = b₃ + b₄ + b₅; a₃ = b₁ – b₂; a₄ = b₃ – b₄ + b₅. †p < .10, *p < .05, **p < .01, ***p < .001

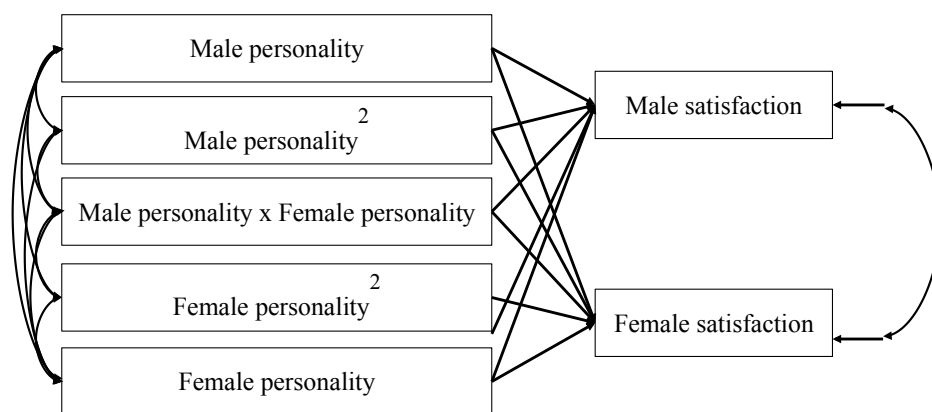


Figure 1. Dyadic polynomial regression model with personality of both partners as predictor and both partners' satisfaction as outcome variables

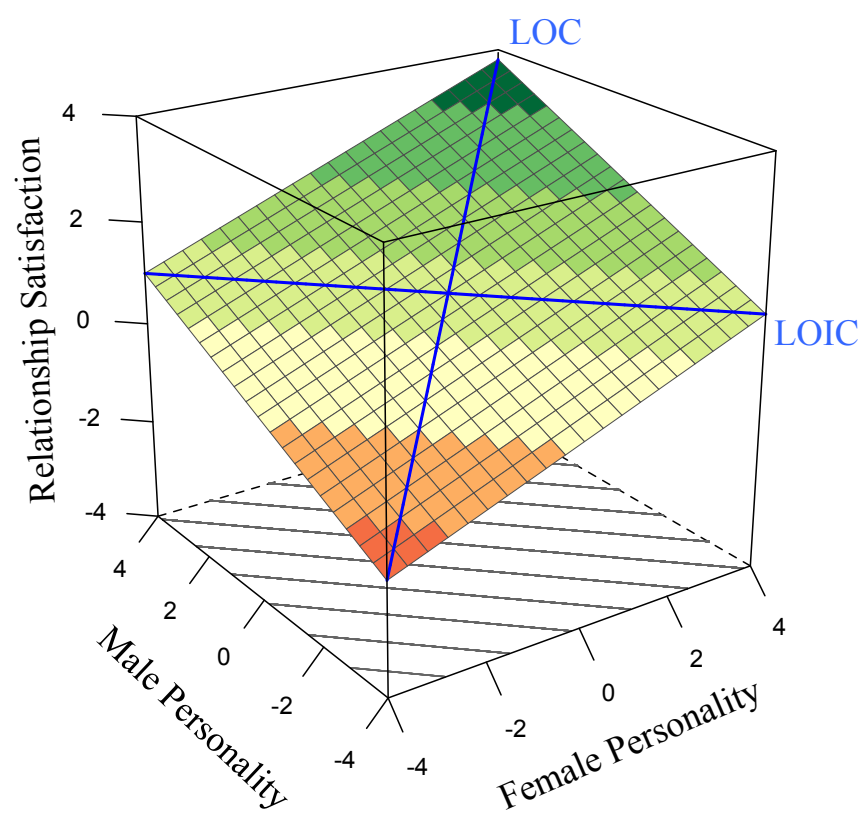


Figure 2. Response surface suggesting an additive main effect of actor and partner effects. LOC = line of congruence. LOIC = line of incongruence.

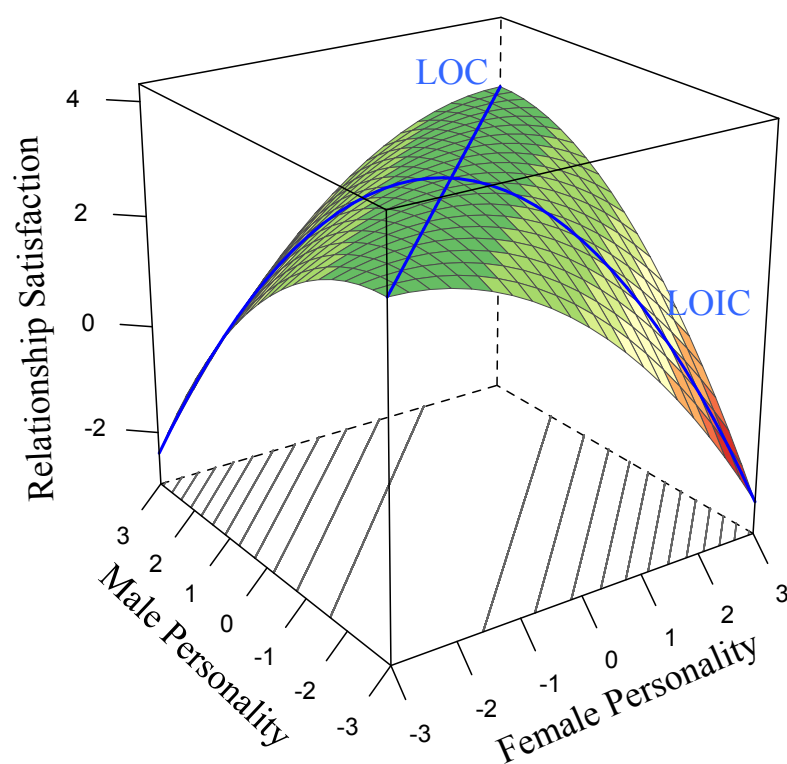


Figure 3. Response surface suggesting a similarity effect. LOC = line of congruence. LOIC = line of incongruence

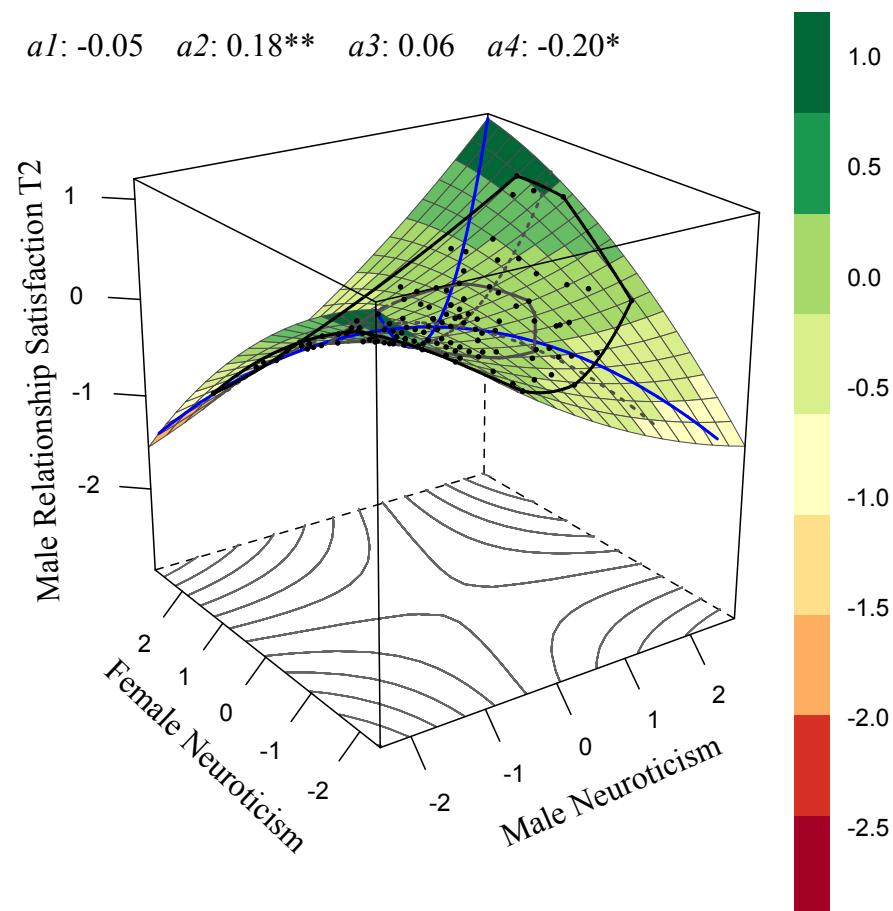


Figure 4. Response surface suggesting an interaction effect. LOC = line of congruence. LOIC = line of incongruence. The dyadic polynomial regression model controlled for relationship satisfaction at T1.

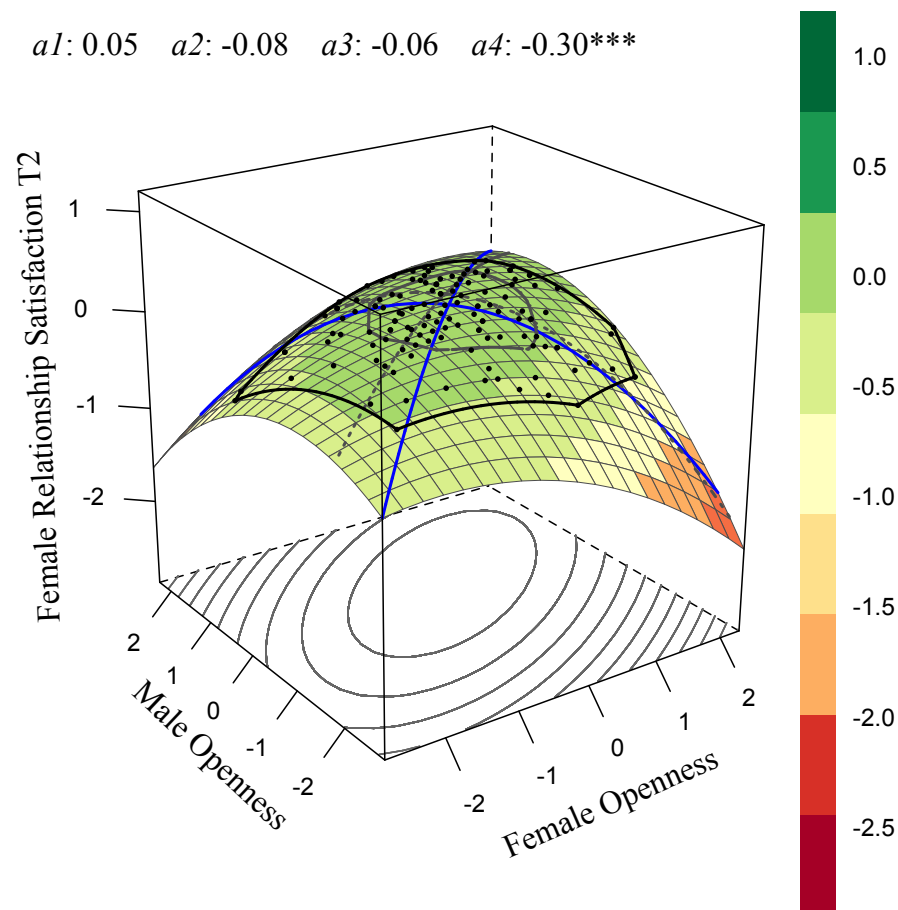


Figure 5. Response Surface suggesting a similarity effect. LOC = line of congruence. LOIC = line of incongruence. The dyadic polynomial regression model controlled for relationship satisfaction at T1.

ONLINE SUPPLEMENTAL MATERIAL: BIG FIVE TRAITS, SELF-ESTEEM, GOALS AND SATISFACTION IN COUPLES

Table 1

Model Comparisons and Model Fit Indices of Cross-Sectional Polynomial APIM and the simple APIM for the Prediction of Relationship Satisfaction

	Model comparison		Model fit of simple APIM		
	Observed $\Delta\chi^2$	<i>p</i> -value	CFI	TLI	RMSEA
Personality characteristics					
Neuroticism	5.13	.53	1.00	1.00	.00
Agreeableness	8.51	.20	.98	.97	.04
Conscientiousness	1.48	.96	1.00	1.00	.00
Extraversion	5.04	.54	1.00	1.00	.00
Openness	3.46	.75	1.00	1.00	.00
Self-Esteem	4.49	.61	1.00	1.00	.00
Intrinsic Goals	6.11	.41	1.00	1.00	.01
Extrinsic Goals	8.44	.21	.98	.97	.04

Notes. Degrees of freedom (*df*) in the model comparisons were: $df_{unconstrained} = 0$, $df_{constrained} = 6$. Critical

$\Delta\chi^2$ for all models was 12.59.

ONLINE SUPPLEMENTAL MATERIAL: BIG FIVE TRAITS, SELF-ESTEEM, GOALS AND SATISFACTION IN COUPLES

Table 2

Model Comparisons and Model Fit Indices of Longitudinal Polynomial APIM and the simple APIM for the Prediction of Relationship Satisfaction

	Model comparison		Model fit of simple APIM		
	Observed $\Delta\chi^2$	<i>p</i> -value	CFI	TLI	RMSEA
Personality characteristics					
Neuroticism	17.56**	.01	.97	.92	.12
Agreeableness	3.26	.78	1.00	1.00	.00
Conscientiousness	5.13	.53	1.00	1.00	.00
Extraversion	4.62	.59	1.00	1.00	.00
Openness	20.53**	.00	.96	.89	.13
Self-Esteem	7.28	.30	1.00	.99	.04
Intrinsic Goals	5.12	.53	1.00	1.00	.00
Extrinsic Goals	7.78	.26	1.00	.99	.05

Notes. Degrees of freedom (*df*) in the model comparisons were: $df_{unconstrained} = 0$, $df_{constrained} = 6$. Critical

$\Delta\chi^2$ for all models was 12.59.

ONLINE SUPPLEMENTAL MATERIAL: BIG FIVE TRAITS, SELF-ESTEEM, GOALS AND SATISFACTION IN COUPLES

Table 3

Model Fits and Model Comparisons of Cross-Sectional Actor–Partner Interdependence Predicting Relationship Satisfaction with Actor and Partner Effects Constrained to be Equal for Both Genders

	Model comparison			Model fit of constrained model		
	Critical $\Delta\chi^2$	Observed $\Delta\chi^2$	<i>p</i> -value	CFI	TLI	RMSEA
Personality characteristics						
Neuroticism	3.84	0.41	.52	1.00	1.00	<.01
Agreeableness	5.99	0.68	.71	1.00	1.00	<.01
Conscientiousness	5.99	0.32	.85	1.00	1.00	<.01
Extraversion	5.99	0.32	.85	1.00	1.00	<.01
Openness	5.99	1.87	.39	1.00	1.00	<.01
Self-Esteem	-	-	-	-	-	-
Intrinsic Goals	7.78	2.66	.26	1.00	.99	.04
Extrinsic Goals	7.05	2.38	.31	1.00	.99	.03

Notes. Degrees of freedom (*df*) in the model comparisons were: $df_{unconstrained} = 0$, $df_{constrained} = 2$. For neuroticism, we were not able to constrain the actor effects without worsening the fit indices, resulting in $df = 1$. For self-esteem, both paths stayed unconstrained.

ONLINE SUPPLEMENTAL MATERIAL: BIG FIVE TRAITS, SELF-ESTEEM, GOALS AND SATISFACTION IN COUPLES

Table 4

Model Fits and Model Comparisons of Longitudinal Actor–Partner Interdependence Predicting Relationship Satisfaction with Actor and Partner Effects Constrained to be Equal for Both Genders

	Model comparison			Model fit of constrained model		
	Critical $\Delta\chi^2$	Observed $\Delta\chi^2$	<i>p</i> -value	CFI	TLI	RMSEA
Personality characteristics						
Neuroticism	9.49	4.00	.41	1.00	1.00	<.01
Agreeableness	9.49	2.26	.69	1.00	1.00	<.01
Conscientiousness	9.49	0.99	.91	1.00	1.00	<.01
Extraversion	9.49	1.56	.82	1.00	1.00	<.01
Openness	9.49	0.81	.94	1.00	1.00	<.01
Self-Esteem	9.49	2.48	.65	1.00	1.00	<.01
Intrinsic Goals	9.49	0.69	.95	1.00	1.00	<.01
Extrinsic Goals	9.49	2.57	.63	1.00	1.00	<.01

Notes. Degrees of freedom (*df*) in the model comparisons were: $df_{unconstrained} = 0$, $df_{constrained} = 4$.

APPENDIX C: Article 3

Weidmann, R., Gomez, V., Erol, R. Y., Ledermann, T., & Grob Beyond neuroticism: The concurrent and longitudinal link between self-esteem and relationship satisfaction mediated by perceptual processes. *Manuscript submitted for publication to European Journal of Personality.*

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SELF-ESTEEM, NEUROTICISM, PERCEPTION AND COUPLE SATISFACTION 1

Running Head: SELF-ESTEEM, NEUROTICISM, PERCEPTION AND COUPLE SATISFACTION

Beyond neuroticism: The concurrent and longitudinal link between self-esteem and
relationship satisfaction mediated by perceptual processes

Rebekka Weidmann

University of Basel

Veronica Gomez

University of Zurich

Ruth Yasemin Erol

University of Bern

Thomas Ledermann

Utah State University

Alexander Grob

University of Basel

Author Note

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Correspondence concerning this article should be addressed to Rebekka Weidmann,
Department of Psychology, University of Basel, Missionsstrasse 62, 4055 Basel, Switzerland.

E-mail: rebekka.weidmann@unibas.ch

SELF-ESTEEM, NEUROTICISM, PERCEPTION AND COUPLE SATISFACTION 2

Abstract

Self-esteem plays a crucial role for satisfaction in romantic relationships and is associated with perceptual processes within couples. Similar results are reported for neuroticism. The current study examines the concurrent and longitudinal dyadic associations between self-esteem and relationship satisfaction and whether perceived regard and perception of the partner mediate these effects above and beyond neuroticism. Further, longitudinal cross-lagged models for self-esteem and relationship satisfaction were tested to examine their possible reciprocal link. All analyses included both partners' neuroticism level to disentangle the distinct effects of self-esteem on perceptual processes and relationship satisfaction. Various Actor-Partner Interdependence Models with 237 age-heterogeneous heterosexual couples were applied. Perceived regard mediated the concurrent actor-actor and actor-partner effects between self-esteem and relationship satisfaction and between neuroticism and relationship satisfaction. Perception of the partner mediated the actor-actor and actor-partner effects of self-esteem on relationship satisfaction. For neuroticism, significant indirect effects emerged for the partner-actor and partner-partner effects. Longitudinally, relationship satisfaction predicted the partner's self-esteem. No significant mediations emerged longitudinally. The results emphasize the importance of examining neuroticism and self-esteem conjointly to reveal their unique associations with perceptual processes.

Keywords: self-esteem, neuroticism, relationship satisfaction, couples, mediation, APIM

Word count: 181 (max. 200)

SELF-ESTEEM, NEUROTICISM, PERCEPTION AND COUPLE SATISFACTION 3

Beyond neuroticism: The concurrent and longitudinal link between self-esteem and relationship satisfaction mediated by perceptual processes

Self-esteem plays a vital role in human interactions, especially in the context of romantic relationships. Research suggests that the subjective evaluation of one's own worth is positively associated with relationship satisfaction (Barelds, 2005; Erol & Orth, 2013; Robinson & Cameron, 2012). In addition, a growing body of research has not only looked at the individual, but has examined both partners within the dyad. These results revealed positive associations between a person's and the partner's self-esteem (Barelds, 2005; Robinson & Cameron, 2012). From this research the question arises as to what processes mediate the link between self-esteem and relationship satisfaction. Few studies exist that focus on processes that could explain this association (Erol & Orth, 2013; Murray, Holmes, & Griffin, 2000; Sciangula & Morry, 2009), especially when examining these relations longitudinally (Murray, Holmes, & Griffin, 1996b). Moreover, only little evidence exists on the potential bi-directionality of self-esteem and relationship satisfaction (Orth, Robins, & Widaman, 2012). As with self-esteem, neuroticism is also linked to perceptual processes and to relationship satisfaction (Denissen & Penke, 2008; Finn, Mitte, & Neyer, 2013; McNulty, 2008). The goal of this paper is to extend previous research by investigating the concurrent and longitudinal effects of self-esteem and relationship satisfaction above and beyond neuroticism. In addition, we also test whether perceptual processes mediate these associations. This approach allows us to examine the predictive validity of self-esteem beyond neuroticism, the potential bi-directionality of self-esteem and relationship satisfaction, and to evaluate the robustness of the mediations of perceptual processes over time.

Self-esteem and Relationship Satisfaction

The positive association between self-esteem and relationship satisfaction has been elaborated and demonstrated in several studies (e.g., Barelds, 2005; Erol & Orth, 2013; Murray, Holmes, & Griffin, 1996a; Robinson & Cameron, 2012; Sciangula & Morry, 2009)

SELF-ESTEEM, NEUROTICISM, PERCEPTION AND COUPLE SATISFACTION 4

with effect sizes ranging from small to medium. Although two studies failed to detect statistically significant associations between a person's self-esteem and relationship satisfaction (Cramer, 2003; Jones & Cunningham, 1996), the majority of studies reveal that self-esteem is positively related to satisfaction with the romantic relationship.

Because romantic relationships typically involve two individuals, the effect of individuals' self-esteem on their relationship satisfaction, as well as on their partners' relationship satisfaction, merits particular attention. The self-broadcasting perspective provides a theoretical base for those partner effects. It suggests that people behave according to their self-esteem and thus elicit positive evaluations from others (Srivastava & Beer, 2005). Studies involving both members of a couple that assess the association between self-esteem and the partner's relationship satisfaction (i.e., partner effect), in addition to the association between self-esteem and the individual's relationship satisfaction (i.e., actor effect), suggest that self-esteem is not only positively associated with an individual's relationship satisfaction, but also with their partners' relationship satisfaction (Barelds, 2005; Erol & Orth, 2013; Robinson & Cameron, 2012). Erol and Orth (2013) analyzed data from five independent samples of romantic couples and found evidence for small to medium-sized actor effects and small-sized partner effects between self-esteem and relationship satisfaction. Likewise, Murray, Holmes, and Griffin (2000) studied dating and married couples and found significant actor effects between self-esteem and relationship satisfaction and small but significant partner effects for both women and men (Murray, Holmes, & Griffin, 2000).

From a theoretical standpoint, it has also been argued that relationship satisfaction can precede and be a valid predictor of self-esteem. The sociometer theory proposes that self-esteem represents a gauge that monitors evaluations from other people and signifies whether an individual is included in a desirable group or relationship (M. R. Leary & Baumeister, 2000). The sociometer seems to be especially sensitive or active within romantic relationships because, in contrast to kin relationships, romantic relationships are affected by perceptions of

SELF-ESTEEM, NEUROTICISM, PERCEPTION AND COUPLE SATISFACTION 5

potential romantic alternatives and can be terminated (Denissen & Penke, 2008). Therefore, if a person reports high satisfaction within the romantic relationship, this satisfaction could in turn affect the level of self-esteem.

Other theoretical assumptions posit a reverse direction of the effect. For instance, the steady display of general well-being might be incorporated in a person's intrapersonal systems and thus change certain traits and characteristics of a person (Soto, 2015). Therefore, one may expect not only that couple member's traits have an influence on both partners' relationship satisfaction but also that satisfaction has an effect on intrapersonal development: a dynamic transactional viewpoint (Neyer & Asendorpf, 2001). Accordingly, persons who report high relationship satisfaction might over time be happier with themselves because they constantly feel the security and satisfaction of a fulfilling relationship and integrate this satisfaction into their own self-image. For example, appreciation and support of one's spouse is associated with higher self-esteem (Vanfossen, 1986). Nevertheless, depending on the stability of the personality characteristic in play, the social environment, such as important social relationships, may have a stronger or weaker effect on that characteristic. Researchers have suggested that core traits, such as the Big Five personality traits, are less affected by the social environment. In contrast, surface characteristics, such as a person's self-concept, are more strongly impacted by environment (McAdams & Pals, 2006; McCrae & Costa, 1999). Self-esteem as a surface characteristic is therefore expected to be interrelated and reciprocally associated with the social context. Furthermore, drawing from the aforementioned self-broadcasting theory (Srivastava & Beer, 2005), the social benefits of self-esteem could also be represented in a person's relationship satisfaction. Because self-esteem is related to being liked by others, the relationships of high self-esteem people might be smoother and more pleasurable, which, in turn, may result in higher relationship satisfaction. Finally, self-esteem reflects a relationship resource (Robinson & Cameron, 2012) inasmuch as romantic partners who report higher self-esteem are more able to build upon positive perceptual biases and

SELF-ESTEEM, NEUROTICISM, PERCEPTION AND COUPLE SATISFACTION 6

less self-protective behaviors, which, in turn, benefits relationship satisfaction (Murray, Holmes, & Griffin, 2000).

Based on this theoretical rationale, we propose a reciprocal association between self-esteem and relationship satisfaction. Testing the directionality of associations between self-esteem and relationship satisfaction bears three important implications. First, it is relevant for theoretical assumptions concerning the link between self-esteem and relationship satisfaction in couples. Theoretical underpinnings include the sociometer theory suggesting that self-esteem stems from social inclusion or exclusion. In contrast, the self-broadcasting theory argues that self-esteem influences the relationship. Hence, longitudinal analyses on directionality are crucial for testing these theories within the context of romantic relationships. Second, identifying the directionality of the link can guide future research on mediating factors explaining the longitudinal associations between self-esteem and relationship satisfaction. Third, implications for prevention would look dramatically different, depending on which variable predicts the other. If self-esteem were essential for later relationship satisfaction, intervention could primarily focus on the individual. If relationship satisfaction were the predictor, interventions may best focus predominantly on the romantic couple.

Few studies exist that have investigated whether self-esteem predicts relationship satisfaction over time or vice versa. A recent study investigated the longitudinal associations between self-esteem and important life outcomes and found that self-esteem predicted relationship satisfaction over a time span of 12 years, but relationship satisfaction did not predict self-esteem (Orth et al., 2012). Likewise, Erol and Orth (2014) studied couples during 12 years and found that change in self-esteem predicted partners' common relationship satisfaction. Another study examined couples across three years and found that initial self-esteem levels predicted change in both partners' satisfaction. In addition, relationship satisfaction also predicted change in self-esteem and change in relationship satisfaction was associated with self-esteem change (Mund, Finn, Hagemeyer, Zimmermann, & Neyer, 2015).

SELF-ESTEEM, NEUROTICISM, PERCEPTION AND COUPLE SATISFACTION 7

Finally, Schaffhuser, Wagner, Lüdtke, and Allemand (2014) tested a latent cross-lagged dyadic model and found that relationship satisfaction of one partner predicted the self-esteem of the other partner but not vice versa. Building on these findings, and the suggestion that cross-lagged path analyses are an appropriate method to unravel effects concerning personality and relationships (Asendorpf & van Aken, 2003), we examine cross-lagged effects between self-esteem and relationship satisfaction.

Mediating Mechanisms between Self-Esteem and Relationship Satisfaction

Relationship satisfaction reflects a person's subjective evaluation of the relationship (Murray, Holmes, Dolderman, & Griffin, 2000). Hence perceptual processes are central in romantic relationships, constituting the world within which each partner lives. We focus on two perceptual processes that might explain part of the association between self-esteem and relationship satisfaction, namely perceived regard and perception of the partner.

Perceived regard as mediator

Perceived regard is defined as how individuals see themselves through their partner's eyes. This meta-perspective has been shown to be linked to both self-esteem and relationship satisfaction and represents a mediating process between self-esteem and relationship satisfaction (Murray, Holmes, & Griffin, 2000). Two theoretical assumptions underpin the association of perceived regard with self-esteem and relationship satisfaction. First, the sociometer theory posits that self-esteem may indicate other people's evaluations of the self (M. R. Leary & Baumeister, 2000). Therefore, the level of self-esteem and the general perceived regard of others are closely tied. Low self-esteem, for example, may signal that few positive evaluations emerged from the social environment. This social rejection results in lower self-esteem (M. R. Leary, 1990; M. R. Leary & Downs, 1995). A high level of self-esteem, in contrast, indicates that a person is a desirable member of a social group (M. R. Leary, 2007).

SELF-ESTEEM, NEUROTICISM, PERCEPTION AND COUPLE SATISFACTION 8

Second, according to the risk regulation model, people adjust their dependency toward a significant other in a self-guarding way contingent on how secure they feel in their relationship (Murray, Holmes, & Griffin, 2000). Felt security is “rooted in the beliefs that a good, responsive partner loves and is committed to the self” (Murray, Holmes, Griffin, Bellavia, & Rose, 2001, p. 424). Therefore, positive perceived regard reflects felt security. Individuals with a positive perceived regard are more satisfied with their relationship, feel safe from getting hurt, and engage more fully in the relationship (Murray, 2005). Self-esteem plays a crucial role in recognizing felt security through perceived regard of the partner and is thus closely tied to perceived regard, which is in turn linked to relationship satisfaction.

Cross-sectional research examining married, cohabiting, and dating couples has shown that perceived regard mediates the link between self-esteem and relationship satisfaction and perceived regard is associated with the partner’s relationship satisfaction (Murray, Holmes, & Griffin, 2000). Another cross-sectional study has examined the effect of perceived regard with respect to proximal relationship traits, including being loving and caring, and distal relationship traits, including being quiet and reserved (Sciangula & Morry, 2009). Relationship-proximal perceived regard was positively associated with self-esteem and relationship satisfaction. In addition, relationship-proximal perceived regard added to the relationship between self-esteem and relational satisfaction but did not significantly mediate the association. Perceived regards of distal relationship traits, however, were not significantly associated with self-esteem.

We are aware of only one study that has examined the mediation of perceived regard longitudinally as well as using a cross-sectional analysis. The results suggest that perceived regard of one partner influences the other partner’s relationship satisfaction over time (Murray, Holmes, & Griffin, 2000). If one partner felt positively regarded within the relationship, the other partner’s satisfaction was higher four but not 12 months later. This study shows that it is crucial to examine the benefits of perceived regard longitudinally to

SELF-ESTEEM, NEUROTICISM, PERCEPTION AND COUPLE SATISFACTION 9

reveal its short- and long-term impact on the satisfaction of romantic partners. Our study will extend this research to test the longitudinal impact of perceived regard, also testing with a cross-lagged mediation model (a) whether perceived regard is not only predicted by self-esteem but also by relationship satisfaction and (b) whether perceived regard not only predicts later relationship satisfaction but also self-esteem.

Perception of the partner as mediator

Perception of the partner is defined as how a person perceives and appraises the partner (Murray et al., 1996a). Within romantic relationships, partners share a sense that their partner is part of their own self (Aron & Aron, 1996; Saslow, Muise, Impett, & Dubin, 2013). Hence, one can assume that individuals project their self-image onto their partner and see the partner in accordance with their own self-view. The relevance of a positive perception of the partner for a satisfied relationship is emphasized by the fact that attributing positive traits to the partner is one of the main reasons people enter into and remain satisfied in intimate relationships (Botwin, Buss, & Shackelford, 1997; Murray et al., 1996b).

As for the association between self-esteem and perception of the partner, research demonstrates that individuals with high self-esteem project their favorable views of themselves onto their partners, resulting in positive perceptions of their partners, whereas individuals with low self-esteem report less positive perceptions of their partners (Murray et al., 1996a, 1996b; Murray, Holmes, & Griffin, 2000). Regarding the association between perceptions of the partner and relationship satisfaction, evidence suggests that a favorable perception of the partner is associated with higher relationship satisfaction, more love and trust, and less conflict and doubt (Cobb, Davila, & Bradbury, 2001; Murray & Holmes, 1997; Murray et al., 1996a). In particular, one longitudinal study has reported positive effects of a positive partner perception on relationship satisfaction (Murray et al., 1996b). Relationships where both partners held a positive view of each other and rated each other positively on interpersonal qualities had a greater chance of persisting and also showed an increase in

SELF-ESTEEM, NEUROTICISM, PERCEPTION AND COUPLE SATISFACTION 10

satisfaction, and a decrease in conflicts and doubts over time (Murray et al., 1996b). In addition, self-esteem was a significant predictor not only for the perception of the partner, but also for the partner's perception of the self in dating and married couples (Murray et al., 1996a). Perception of the partner, in turn, was tied to both partners' relationship quality (Murray, Holmes, Dolderman, et al., 2000; Murray et al., 1996a; Murray, Holmes, & Griffin, 2000)

We know of one longitudinal study that examined the mediation of perception of the partner in the association between self-esteem and relationship satisfaction (Murray et al., 1996b). Participants rated themselves and how they perceived their partners on the interpersonal qualities scale (IQS) and reported their relationship quality. Self-reported perception of the partner at three time points (baseline and 5 and 12 months later) and perception of the partner at baseline predicted both partners' relationship quality at all time points (Murray et al., 1996b). The opposite direction—as to whether relationship quality fosters positive perceptions of the partner or of the self—has not yet been tested. We build on this research and use a cross-lagged dyadic approach that allows us to assess the directionality of the effects between self-esteem and relationship satisfaction and to test the mediating role of perception of the partner.

Above and Beyond Neuroticism

Previous research demonstrates that neuroticism and self-esteem are strongly negatively associated (e.g., Robins, Tracy, Trzesniewski, Potter, & Gosling, 2001; Weidmann, Ledermann, & Grob, 2016). Moreover, neuroticism and self-esteem share important life outcomes, such as relationship satisfaction, life satisfaction, depression, and health (Dyrenforth, Kashy, Donnellan, & Lucas, 2010; Kendler, Kuhn, & Prescott, 2004; Lahey, 2009; Orth et al., 2012; Sowislo & Orth, 2013). Evidence even suggests subsuming self-esteem and neuroticism into core self-evaluations. Core-evaluations reflect an overarching construct, which also include self-efficacy and locus of control. These constructs seem to

SELF-ESTEEM, NEUROTICISM, PERCEPTION AND COUPLE SATISFACTION 11

serve similar functions (Judge, Erez, Bono, & Thoresen, 2002). Research has repeatedly highlighted the importance of neuroticism (Karney & Bradbury, 1995; Kelly & Conley, 1987), and recent studies suggest that neuroticism is linked to negative cognitive processes: neurotic romantic partners tend to interpret ambiguous situations with their partner more negatively (Finn et al., 2013). Neurotic partners also expect an upcoming interaction to be more negative and perceive the interaction behavior of their partner more adversely (McNulty, 2008). Generally speaking, evidence suggests that neuroticism is linked with feelings of social inclusion similar to self-esteem (Denissen & Penke, 2008). Thus, due to the large overlap of self-esteem and neuroticism in their prediction of perceptual processes within romantic relationships, it seems crucial to include the impact of neuroticism in the study of perceptual processes and relationship satisfaction to extract the unique contribution of self-esteem.

Researchers have suggested that the conjoint examination of Big Five traits and self-esteem will uncover how self-esteem relates to similar outcomes (Robins et al., 2001). Further, comparable processes within social relationships might be present with regard to neuroticism and self-esteem (Denissen & Penke, 2008). Whereas some studies have exclusively looked at neuroticism and its processes within romantic relationships (e.g., Finn et al., 2013; McNulty, 2008) others have focused on self-esteem (e.g., Erol & Orth, 2013; Murray, Holmes, & Griffin, 2000). However, since these two constructs overlap in their predictive validity for perceptual processes and relationship outcomes, it is our goal to disentangle the individual contribution of self-esteem in the interplay between perceptual processes and relationship satisfaction in couples above and beyond neuroticism. Such a distinction will give a more holistic picture of personality. More specifically, it will reveal the importance of core characteristics, such as neuroticism, and surface characteristics, such as self-esteem, in romantic couples (Kandler, Zimmermann, & McAdams, 2014).

SELF-ESTEEM, NEUROTICISM, PERCEPTION AND COUPLE SATISFACTION 12

The Present Study

The present study has two goals: First, we investigate whether individuals' self-esteem and neuroticism is associated their relationship satisfaction (i.e., actor effect) and to their partners' relationship satisfaction (i.e., partner effect). Further, we test whether these actor and partner effects are mediated by perceived regard and perception of the partner.

Second, we aim to examine the dyadic reciprocal association between self-esteem and relationship satisfaction longitudinally and test whether perceived regard and perception of the partner mediate the links between self-esteem and relationship satisfaction across a two year interval, again controlling for both partners' neuroticism levels. Given scarce evidence on these longitudinal associations, we do not state specific hypotheses, but a bidirectional association between self-esteem and relationship satisfaction is plausible based on the research of Mund et al. (2015).

The present study extends previous research in four ways. First, the association between self-esteem and relationship satisfaction has not often been investigated within a dyadic approach. Second, our study joins research that does not recruit student samples but instead a sample with a wide age range (Barelds, 2005; Erol & Orth, 2013; Murray et al., 1996a; Murray, Holmes, & Griffin, 2000). Third, this is one of the first longitudinal studies to investigate cross-lagged dyadic effects between self-esteem and relationship satisfaction mediated by perceived regard and perception of the partner. Our study addresses the question as to whether perceptual processes have a long-lasting effect on relationship satisfaction and the partners' self-esteem. Finally, including the impact of neuroticism provides a more distinct picture of the influence of self-esteem on perceptual processes and relationship satisfaction in couples.

SELF-ESTEEM, NEUROTICISM, PERCEPTION AND COUPLE SATISFACTION 13

Method**Participants**

Data collection took place as part of a large-scale three-generation family study entitled the Co-Development in Personality study (e.g., Furler, Gomez, & Grob, 2014; Schaffhuser, Allemand, & Martin, 2014). The aim of this longitudinal study is to investigate personality development in close social relationships from intra- and intergenerational perspectives. The sample of the present study included individuals in a romantic relationship with data of both couple members. At the start of the study (T1), 237 heterosexual couples living in urban, suburban, or rural regions of German-speaking Switzerland participated (M age = 48.4 years, SD = 19.6 for women, and M = 50.7 years, SD = 20.1 for men). On average, couples had been together for 22.6 years (SD = 17.2), with the majority of couples being married (70.9%). After two years (T2), 141 couples remained in the study. Dropout analyses revealed no significant differences in demographic and study variables between couples that participated at Time 2 and participants that did not.

Measures

At T1, participants completed questionnaires on self-esteem, relationship satisfaction, perceived regard and perception of the partner. Two years later (Time 2) the same questionnaires were completed and we used data for self-esteem and relationship satisfaction to compute longitudinal models.

Self-esteem. Participants' self-esteem was measured with the German version of the Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965; von Collani & Herzberg, 2003). The RSES is a 10-item questionnaire to assess a global evaluation of the self on a four-point scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*). Example items are "I feel that I have a number of good qualities" and "I feel that I am a person of worth, at least on an equal basis with others". Internal consistency measured by Cronbach's alpha was .86 for T1 and .83 for time 2.

SELF-ESTEEM, NEUROTICISM, PERCEPTION AND COUPLE SATISFACTION 14

Relationship satisfaction. The German version of the Relationship Assessment Scale (RAS; Hendrick, 1988; Sander & Böcker, 1993) was used to assess each partner's satisfaction with the relationship. Participants rated seven items on a five-point scale ranging from 1 (*low satisfaction*) to 5 (*high satisfaction*). Example items are "To what extent has your relationship met your original expectations?" and "How well does your partner meet your needs?" The reliability of the scale was $\alpha = .89$ (T1) and $\alpha = .90$ (T2).

Measuring perceived regard and perception of the partner. The Interpersonal Qualities Scale (IQS) has been used in previous studies to assess perceptual processes (e.g., Murray, Holmes, and Griffin (2000). IQS originates in the interpersonal circumplex (T. Leary, 1957) and consists of attributes such as warm, patient, open, and affectionate. An alternative approach is the Big Five model, which assesses the entire personality (Barelds & Dijkstra, 2011) and is not limited to characteristics "in terms of what [individuals] do to each other" (Wiggins, 1979, p. 396) compared to the IQS. We extend previous research by using the Big Five traits for the rating of the partner as well as the perceived partner rating.

Perceived regard. The German short version of the Big Five Inventory (John & Srivastava, 1999; Rammstedt & John, 2005) was used to assess perceptions of the partner's regard. Participants were instructed to think how their partner would describe them and rated themselves as they thought they were seen by their partner on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Neuroticism was recoded so that higher scores mean higher emotional stability. The responses were then aggregated to a mean score representing perceived regard ($\alpha = .79$).

Perception of the partner. In a similar vein, the same items of the BFI were used to assess participants' perception of their partner. Participants were instructed to think about their partner and rate their partner's personality (i.e., extraversion, emotional stability, and agreeableness) on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Again, neuroticism was recoded so that higher ratings represent higher emotional

SELF-ESTEEM, NEUROTICISM, PERCEPTION AND COUPLE SATISFACTION 15

stability. These perceptions were then aggregated to an overall mean score representing the perception of the partner ($\alpha = .83$).

Neuroticism. Self-ratings of neuroticism were measured with the Big Five Inventory (John & Srivastava, 1999) containing 45 items in total. Eight items reflected neuroticism and were rated on a five-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Participants were asked to think of how they would describe themselves in general. Example items for neuroticism include “Can be moody” and “Am relaxed, handle stress well.” (reverse-coded). Internal reliabilities were good, with $\alpha = .85$.

Statistical Approach

We applied the Actor–Partner Interdependence Model (APIM) to account for interdependencies within dyadic data (Cook & Kenny, 2005). This model treats the dyad as an analytical unit and provides actor and partner effects for the association between partners’ self-esteem and their relationship satisfaction. The basic APIM contains two predictors, one for women’s and one for men’s self-esteem, and two outcomes, one for women’s and one for men’s relationship satisfaction. Our APIMs were extended for both partners’ neuroticism as predictors (see Figure 1). An actor effect denotes the effect of each partner’s self-esteem on his or her own relationship satisfaction. A partner effect denotes the effect of each partner’s self-esteem on the other partner’s relationship satisfaction.

Insert Figure 1 about here

To test whether perceived regard and perception of the partner mediate the association between self-esteem and relationship satisfaction, we employed the Actor–Partner Interdependence Mediation Model (APIMeM; Ledermann, Macho, & Kenny, 2011). There are various mediations that can be tested with an APIMeM. We were specifically interested in two types of mediations: First, we investigated the mediation involving two actor effects; that

SELF-ESTEEM, NEUROTICISM, PERCEPTION AND COUPLE SATISFACTION 16

is, whether perceived regard and perception of the partner mediate the link between self-esteem/neuroticism and relationship satisfaction (actor–actor indirect effect). Second, we were interested in whether perceived regard and perception of the partner (actor effect) mediate the association between self-esteem/neuroticism and the partner’s relationship satisfaction (partner effect) (actor–partner indirect effect) (see Figure 2).

Insert Figure 2 about here

To test longitudinal associations, we employed a cross-lagged APIM and a cross-lagged APIMeM with the data of 141 couples. The cross-lagged APIM tests whether self-esteem predicts relationship satisfaction or whether relationship satisfaction predicts self-esteem, controlling for the stability of both variables (Figure 3) and with both partners’ neuroticism as additional predictor variables. Moreover, we tested two cross-lagged APIMeMs in order to investigate whether perceived regard and perception of the partner are preceded by self-esteem or relationship satisfaction and, additionally, whether these mediators yield longitudinal effects over the time span of two years on either relationship satisfaction or self-esteem (Figure 4). Again, both partners’ neuroticism was also entered as predictor. We know of no study that has tested this model with regard to self-esteem and relationship satisfaction.

Insert Figure 3 about here

The analyses were conducted using R and the lavaan package (Rosseel, 2012) and the full-information maximum likelihood (FIML) estimation to handle missing data. Using manifest variables, the basic model is a saturated model with zero degrees of freedom (df). In a first step, we modeled a basic APIM to analyze actor and partner effects of self-esteem on relationship satisfaction. In a second step, to test the mediation of perceived regard and

SELF-ESTEEM, NEUROTICISM, PERCEPTION AND COUPLE SATISFACTION 17

perception of the partner, we estimated two APIMeMs and examined the direct, indirect, and total effects. In all models, we tested whether actor and partner effects could be set invariant for men and women without significantly worsening model fit.

Insert Figure 4 about here

To assess model fit, we considered the Tucker-Lewis index (TLI), the comparative fit index (CFI), and the root-mean-square error of approximation (RMSEA). According to Hu and Bentler (1999), a good model fit is indicated by TLI and CFI values equal to or greater than .95, and equal to or less than .06 for RMSEA. Nested model comparisons were evaluated with the test of small difference in fit (MacCallum, Browne, & Cai, 2006). The significance of indirect effects was tested using bias-corrected bootstrap confidence intervals (BC CI) based on 5,000 bootstrap samples, which has often been recommended for assessing mediation mechanisms (MacKinnon, Lockwood, & Williams, 2004; Preacher & Hayes, 2008).

Results

Concurrent Effects of Self-Esteem on Relationship Satisfaction

In the first step of our analyses¹, we estimated a basic APIM to investigate the actor and partner effects of self-esteem and neuroticism on relationship satisfaction (Figure 1). Constraining the actor and partner effects to be invariant for men and women did not lead to a worse model fit of the constrained model when compared to the saturated model ($df_{\text{constrained}} = 4$, critical $\Delta\chi^2 = 16.26$, observed $\Delta\chi^2 = 7.42$, *ns*) with a satisfactory fit (CFI = .98, TLI = .95, RMSEA = .06). A significant actor effect emerged for self-esteem on relationship satisfaction ($\beta = .12$, $p = .02$), whereas the partner effect was not statistically significant ($\beta = .06$, $p = .26$). Neuroticism was not significantly associated with the relationship satisfaction of participants ($\beta = -.06$, $p = .26$) or their partners ($\beta = -.07$, $p = .14$). This model explained 3.8% of the variance in female relationship satisfaction and 4.4% in male relationship satisfaction.

SELF-ESTEEM, NEUROTICISM, PERCEPTION AND COUPLE SATISFACTION 18

Mediating role of perceived regard. We tested whether perceived regard mediated the actor and partner effects between self-esteem or neuroticism and relationship satisfaction all measured at T1 (Figure 2) by extending the basic APIM to an APIMeM, adding female and male perceived regard as mediators into the analyses. All actor and partner effects were constrained to be invariant for men and women ($df_{\text{constrained}} = 10$, critical $\Delta\chi^2 = 22.8$, observed $\Delta\chi^2 = 12.6$, *ns*) and the model fit the data very well (CFI = .99, TLI = 0.98, RMSEA = .03). This model accounted for 40% of explained variance in female perceived regard and 28.2% of explained variance in male perceived regard, as well as 13% of explained variance in female relationship satisfaction and 15% in male relationship satisfaction. Table 1 shows the results of the APIMeMs. The results reveal that both self-esteem and neuroticism are not significantly associated with relationship satisfaction. Self-esteem was positively and neuroticism negatively related to self-reported perceived regard, which in turn was related to both self-reported relationship satisfaction as well as to the partner's relationship satisfaction. In other words, the higher a person's self-esteem and lower that person's neuroticism, the higher that person's perceived regard and both their own and their partner's relationship satisfaction.

Insert Table 1 about here

Finally, we tested the indirect effects for significance. Four significant mediating paths emerged: One is the actor–actor indirect effect of self-esteem, perceived regard, and relationship satisfaction ($b = .06$, 95% BC CI [0.029, 0.116]), indicating that in both men and women the association between their self-esteem and relationship satisfaction is mediated through their perceived regard. The second indirect effect is the actor–partner indirect effect involving self-esteem, perceived regard, and the partner's relationship satisfaction ($b = .07$, 95% BC CI [0.037, 0.136]). This indicates that the perceived regard of the partner mediates

SELF-ESTEEM, NEUROTICISM, PERCEPTION AND COUPLE SATISFACTION 19

the effect between self-esteem and the partner's relationship satisfaction. The same actor-actor ($b = -.10$, 95% BC CI [-0.16, -0.06]) and actor-partner indirect effects ($b = -.12$, 95% BC CI [-0.19, -0.07]) emerged for neuroticism, demonstrating that perceived regard significantly mediated the association between neuroticism, perceived regard, and both partners' relationship satisfaction.

Mediating role of perception of the partner. We ran the same APIMeM with perception of the partner as mediator. All effects could be constrained to gender-equality with no significant worsening of model fit ($df_{\text{constrained}} = 10$, critical $\Delta\chi^2 = 28.4$, observed $\Delta\chi^2 = 16.1$, *ns*). The APIMeM showed a good model fit (CFI = 0.98, TLI = 0.96, RMSEA = .05) and explained 14% of the variance of women's perceptions of the partner, 22% of the explained variance of men's perceptions of the partner, and 23% of explained variance in women's relationship satisfaction and 23.2% in men's relationship satisfaction. Table 1 shows that The direct actor and partner effects between self-esteem and relationship satisfaction were not significant. There was also no significant association between neuroticism and relationship satisfaction. In addition, a person's self-esteem was a significant predictor of the self-reported perception of the partner and the partner's perception of oneself (however, only marginally), which in turn was related to both partners' relationship satisfaction. Neuroticism revealed a significant effect on the partner's perception of oneself. Hence, the higher a person's neuroticism, the more negatively the partner perceived that person.

The results revealed that four mediation effects were significant. First, the actor-actor indirect effects between a person's self-esteem, perception of the partner, and relationship satisfaction emerged ($b = .11$, 95% BC CI [0.063, 0.179]). Second, the actor-partner indirect effect was significant ($b = .05$, 95% BC CI [0.024, 0.095]), which suggests that self-esteem is linked to how individuals see their partner, which in turn is associated with their partners' relationship satisfaction. Third, the significant partner-actor indirect effect of neuroticism, the partner perception of oneself, and the partner's relationship satisfaction was significant ($b = -$

SELF-ESTEEM, NEUROTICISM, PERCEPTION AND COUPLE SATISFACTION 20

.12, 95% BC CI [-0.176, -0.081]). Finally, for neuroticism, the results reveal a significant partner–partner indirect effect ($b = -.06$, 95% BC CI [-0.092, -0.030]), reflecting a substantial indirect effect between neuroticism, the partner's perception of oneself, and relationship satisfaction.

Cross-Lagged Effects of Self-Esteem and Relationship Satisfaction

For the longitudinal analyses, we estimated a cross-lagged APIM with self-esteem and relationship satisfaction measured in both partners at two time points, controlling for both partners' neuroticism at T1 (see Figure 3). All the paths could be set equally across men and women without worsening the model fit ($df_{\text{constrained}} = 12$, critical $\Delta\chi^2 = 28.2$, observed $\Delta\chi^2 = 8.7$, *ns*). The model fit the data well (CFI = 1.00, TLI = 1.00, RMSEA < .001) and explained 70% of the explained variance in the relationship satisfaction of women and 66% in men, as well as 56% in women's self-esteem and 47% in men's self-esteem.

As expected, both self-esteem and relationship satisfaction showed high stability ($\beta = .63$, $p < .001$; $\beta = .70$, $p < .001$, respectively). In addition, a significant partner effect emerged between one partner's relationship satisfaction and the other partner's relationship satisfaction ($\beta = .15$, $p < .001$). If one partner reported high relationship satisfaction at T1, the other partner reported high relationship satisfaction after two years. Finally, this model revealed two marginally significant effects: First, neuroticism predicted later self-esteem levels ($\beta = -.09$, $p = .07$). The neurotic individuals tended to have lower self-esteem two years later. Second, relationship satisfaction of one partner predicted the other partner's self-esteem level two years later ($\beta = .11$, $p = .06$). If one partner was satisfied with the relationship at T1, then the other partner tended to report high self-esteem two years later too.

Cross-lagged model with perceived regard as mediator. We added perceived regard of both partners at T1 as mediators into the cross-lagged model (Figure 4). All effects could be set equally between men and women ($df_{\text{constrained}} = 22$, critical $\Delta\chi^2 = 33.9$, observed $\Delta\chi^2 = 21.2$, *ns*) and the model fit was good (CFI = 1.00, TLI = 1.00, RMSEA < .001).

SELF-ESTEEM, NEUROTICISM, PERCEPTION AND COUPLE SATISFACTION 21

This longitudinal mediation model explained 71% in female and 66% in male relationship satisfaction, 57% in female self-esteem and 48% in male self-esteem, and 36% of the variance in female and 25% in male perceived regard was explained.

One partner's relationship satisfaction predicted the other partner's satisfaction ($\beta = .15, p = .001$) and the partner's self-esteem at a marginal level ($\beta = .12, p = .08$). The self-esteem of one partner also predicted the other partner's self-esteem at a marginal level ($\beta = .09, p = .08$). Table 2 shows further results of the longitudinal mediation model. Significant effects of self-esteem and neuroticism to perceived regard emerged. The neuroticism was also related to the partner's perceived regard at a marginal level. Further, relationship satisfaction was marginally related to perceived regard. No significant actor and partner effects of perceived regard on relationship satisfaction and self-esteem at T2 emerged. Consequently, we found no significant indirect effects.

Cross-lagged model with perception of the partner as mediator. The last model included the perception of both partners about their intimate partner as mediators. All paths were set equally across men and women ($df_{\text{constrained}} = 22$, critical $\Delta\chi^2 = 33.9$, observed $\Delta\chi^2 = 12.6, ns$). The model fit was very good (CFI = 1.00, TLI = 1.00, RMSEA < .001). The mediation model with perception of the partner did not explain additional variance in self-esteem and relationship satisfaction T2 compared to previous models. However, the model explained 35.9% of the variance in female perception of the partner and 45.4% in male perception of the partner. The longitudinal path coefficients between self-esteem and relationship satisfaction were similar in size and comparable to the longitudinal mediation model with perceived regard as mediator. The negative association between neuroticism and self-esteem was also replicated. In addition, four significant paths emerged that were associated with perception of the partner (Table 2). First, self-esteem showed significant actor effects with perception of the partner signifying that individuals' self-esteem is positively associated with how they view their partner. Second, significant partner effects between self-

SELF-ESTEEM, NEUROTICISM, PERCEPTION AND COUPLE SATISFACTION 22

esteem and perception of the partner emerged, demonstrating that self-esteem is also linked to how the partner sees oneself. Third, relationship satisfaction showed a large actor effect on perception of the partner. Thus, more satisfied individuals tend to see their partners with a rosier view. Finally, the partner's neuroticism was negatively linked to an individual's perception of the partner. No significant paths emerged between perception of the partner and relationship satisfaction and self-esteem at T2, signifying no mediation of perception of the partner between the longitudinal effects of self-esteem and relationship satisfaction.

Insert Table 2 about here

Discussion

The goal of the current study was to examine concurrent and longitudinal links between self-esteem, neuroticism, and relationship satisfaction while testing whether two perceptual processes – perceived regard and perception of the partner – mediate these associations.

Self-esteem, neuroticism, and relationship satisfaction

With regard to self-esteem, we found an actor effect between self-esteem and relationship satisfaction across partners. This finding lines up with existing evidence and supports the notion of a link between self-esteem and satisfaction in romantic relationships. The actor effect was small in size but generally comparable in magnitude to previous studies (Barelds, 2005; Erol & Orth, 2013; Robinson & Cameron, 2012). However, no partner effects emerged, contrasting with previous results (Barelds, 2005; Erol & Orth, 2013; Murray et al., 1996a, 1996b; Murray, Holmes, & Griffin, 2000; Robinson & Cameron, 2012). This could be partly due to the control of neuroticism.

With regard to the cross-sectional results of neuroticism, no direct effects emerged for neuroticism predicting relationship satisfaction, although the effect pointed toward the expected direction. Even though past research has repeatedly emphasized the importance of

SELF-ESTEEM, NEUROTICISM, PERCEPTION AND COUPLE SATISFACTION 23

neuroticism for relationship outcomes (Finn et al., 2013; Karney & Bradbury, 1995; Kelly & Conley, 1987), self-esteem's actor effect prevailed while controlling for the neuroticism level of both partners. These results might give some indication of the proximal role of self-esteem in predicting relationship satisfaction. Big Five traits seem to be more distal predictors (Dyrenforth et al., 2010), whereas self-esteem might be a more proximal construct. Further, the lack of a significant neuroticism effect might point to a possible mediating role of self-esteem, which has been tested elsewhere (Weidmann et al., 2016).

Our study contributes to the scant body of longitudinal studies that have tested the association of self-esteem and relationship satisfaction, revealing that relationship satisfaction of one partner predicts the partner's relationship satisfaction and the partner's self-esteem over a time period of two years, replicating findings of Schaffhuser, Wagner, et al. (2014). Despite the small effect size, the results are important because of their interpersonal nature and they confirm the contagion or interdependence of satisfaction in couples. If one partner is satisfied, the other partner also tends to be satisfied with the relationship over time. Likewise, if one partner is dissatisfied with the relationship it is more likely that the other partner will experience lower satisfaction.

Moreover, these interpersonal effects speak in favor of the sociometer theory (M. R. Leary & Baumeister, 2000). If one partner is satisfied with the overall relationship the other partner will benefit with a higher level of self-esteem and satisfaction with the relationship in general over time. In addition, the current results partly corroborate the person-relationship transaction view (Neyer & Asendorpf, 2001), which suggests that the individual and the relationship can impact each other such that interpersonal encounters profoundly affect self-esteem (Zeigler-Hill, 2010). Further, the results confirm the contagion or interdependence of satisfaction in couples. It might be interesting to study the longitudinal link of self-esteem and relationship satisfaction in different groups of couples to examine whether the associations hold in couples who are steadily satisfied, gradually less satisfied, or unsatisfied. Furthermore,

SELF-ESTEEM, NEUROTICISM, PERCEPTION AND COUPLE SATISFACTION 24

we suspect that the influence of the partner could be stronger or weaker depending on their level of satisfaction. Despite these possible moderating factors, our results confirm the important interpersonal role of relationship satisfaction within couples.

Perceptual processes as mediators

The perceptual processes, perceived regard, and perception of the partner mediated the concurrent associations between self-esteem and relationship satisfaction. First, perceived regard mediated the actor and partner effects between self-esteem and relationship satisfaction. In line with previous studies, the results suggest that people with higher self-esteem also perceived themselves more positively through their partners' eyes and, in turn, they and their partner reported higher relationship satisfaction (Murray, Holmes, & Griffin, 2000; Sciangula & Morry, 2009). Murray et al. (2001) suggest that romantic partners might feel insecure in their relationship due to their low self-esteem and negative perceived regard. Nevertheless, partners hope for affirmation from their partners. But, due to their low self-regard, which in turn decreases their perception of affirmation, they seem to be less able to perceive positive feedback from their partner. This might foster insecurity and in turn may lead to a self-fulfilling prophecy where positive affirmation of the partner decreases as a function of the insecure and anxious counterpart. Similarly, but in terms of a virtuous cycle, it can be assumed that individuals with high self-esteem also desire to feel validated by their partner. But, in contrast, their higher self-esteem may enable them to perceive their partner's regard of them as positive. Consequently, they feel more secure and emotionally close to their partner, which is in turn linked to their relationship satisfaction (Murray, Holmes, & Griffin, 2000; Murray, Holmes, MacDonald, & Ellsworth, 1998).

In addition, the results reveal that the perception of the partner also acted as a mediating process of actor and partner effects of self-esteem on relationship satisfaction. Both partners' self-esteem predicted how their partners perceived their counterpart and this perception of the partner showed a positive association with both partners' satisfaction.

SELF-ESTEEM, NEUROTICISM, PERCEPTION AND COUPLE SATISFACTION 25

Therefore, the higher a person's self-esteem, the more positively both partners saw each other and the more satisfied both partners were with their relationship. These results underscore the intertwined nature of self-evaluation and the perception of the partner. It seems that the attribution of worth to oneself mirrors the generosity with which a person is able to appraise the partner. Moreover, the positive perception of the partner is essential for a satisfying relationship. We were able to show that, if individuals perceive their partner positively, their relationship satisfaction is also higher. Additionally, our study revealed that this perception of the partner was associated not only with self-reported relationship satisfaction but also with the partner's relationship satisfaction. The partner effect points to the fact that conscious or unconscious processes might be active (e.g., open nagging or subtle signs of confidence in the partner) that convey the appraisal of one partner to the other. The effect sizes of both APIMeMs are comparable to others' research findings (Murray et al., 1996b; Murray, Holmes, & Griffin, 2000) and indicate the robustness of the results, suggesting that findings are not "due to idiosyncrasies of any particular operationalization" (Anusic & Lucas, 2014, p. 371). In conclusion, these cross-sectional results underline the postulated associations between individual and relationship dispositions and the mediating role of social interaction units including perceptual processes as theorized by the PERSOC model (Back et al., 2011), which underpins the associations between self-esteem, perceptual processes, and relationship satisfaction (Back et al., 2011).

Regarding the mediating role of perceptual processes for neuroticism, neurotic partners tended to more negatively perceive how their partner sees them. In addition, their partner did perceive them more negatively. No significant actor effect emerged between neuroticism and perception of the partner. This might hint at the unique function of self-esteem to enable romantic partners to perceive their partner in a more generous light (Murray et al., 1996a). Therefore, we argue that neuroticism and self-esteem might also operate differently in some cases (cf. Judge et al., 2002). However, similar to self-esteem, neuroticism

SELF-ESTEEM, NEUROTICISM, PERCEPTION AND COUPLE SATISFACTION 26

was associated with perceived regard and how the partner sees the individual. These results suggest that the risk-regulation framework might be adapted for the personality trait neuroticism (Murray, 2005; Murray, Holmes, & Griffin, 2000). The ability of perceiving the partner's positive regard might be equally dampened by self-esteem and neuroticism, as shown by our results. However, unlike self-esteem, neuroticism was not linked to the perception of the partner. We therefore argue that perceiving felt security through perceived regard might be more difficult for neurotic and low self-esteem individuals. In line with Denissen and Penke (2008), our results demonstrate that neuroticism and self-esteem share similar processes linked to the feelings of social inclusion.

Regarding the longitudinal mediations, we found that self-esteem and neuroticism were cross-sectionally associated with perceived regard and perception of partner (as mentioned above). In addition, relationship satisfaction at T1 was marginally significantly linked to perceived regard and strongly linked to the perception of partner. Thus, a certain general positivity bias could also be responsible for perceptual processes in romantic relationships. However, perceived regard had no longitudinal effect on either relationship satisfaction or self-esteem of both partners at T2. The lack of longitudinal mediations could be explained by the 24 months measurement interval. In the study of Murray, Holmes, and Griffin (2000) significant longitudinal mediations for perceived regard emerged within four months, but not 12 months. Thus, it seems crucial for future studies to consider the time span when studying perceptual processes in romantic partners.

Strengths and limitations

The current study has several strengths. First, the sample is diverse and includes married and dating romantic couples as well as a broad age and relationship duration range, which increases the generalizability of the results. Second, a dyadic approach was employed to investigate effects of self-esteem, relationship satisfaction, and perceptual processes that account for the interdependence in couples above and beyond neuroticism. This analytic

SELF-ESTEEM, NEUROTICISM, PERCEPTION AND COUPLE SATISFACTION 27

procedure is parsimonious, hypothesis driven, and provides accurate estimates. Third, applying the Big Five model is an alternative way to assess perceived regard and perception of the partner, yet it yielded similar results to past research (e.g., Murray, Holmes, & Griffin, 2000). Measuring a construct with different operationalization highlights the robustness of the results (Anusic & Lucas, 2014; Sciangula & Morry, 2009). Finally, this study is one of the first to test dyadic cross-lagged mediation models in order to unravel the effects between self-esteem, neuroticism, and relationship satisfaction and their associations with perceptual processes. The evidence suggests large overlap in the predictive validity of self-esteem and neuroticism on perceptual processes. However, differences also emerged, which underscore the importance of studying these closely tied constructs together.

The study also suffers from limitations. First, the sample—although age-heterogeneous—is a convenience sample and not representative of Swiss couples in general. Future research should replicate these results using more representative samples. Second, even though we controlled for the influence of neuroticism, there might be other variables influencing perceptual processes in romantic relationships, such as optimism (Srivastava, McGonigal, Richards, Butler, & Gross, 2006). Third, our analyses relied on self-report data. Although self-esteem and relationship satisfaction are usually measured with self-report measures, research has linked higher self-esteem with more socially desirable answering tendencies, which might have biased the results (Robins et al., 2001). Finally, more elaborate models with a greater number of time points would result in a more comprehensive picture of the course of romantic relationships and how mediational processes change over time.

Conclusion

The current study illuminates the distinct predictive validity of self-esteem and neuroticism for perceptual processes in romantic couples. Furthermore, our evidence highlights the relevance of one partner's relationship satisfaction for the other partner's relationship satisfaction and self-esteem in a longitudinal perspective. The current evidence

SELF-ESTEEM, NEUROTICISM, PERCEPTION AND COUPLE SATISFACTION 28

calls for further investigations on the understanding of how perceptual processes explain the link between self-esteem, neuroticism, and satisfaction across time.

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SELF-ESTEEM, NEUROTICISM, PERCEPTION AND COUPLE SATISFACTION 35

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SELF-ESTEEM, NEUROTICISM, PERCEPTION AND COUPLE SATISFACTION 38

Footnotes

¹Results did not differ with relationship duration as control variable.

SELF-ESTEEM, RELATIONSHIP SATISFACTION AND PERCEPTION

Table 1

Results of the Actor–Partner Interdependence Mediation Models with Self-Esteem and Neuroticism predicting Relationship Satisfaction and Perceived Regard and Perception of Partner as Mediators.

Effects	SE > RS		SE > M		N > RS		N > M		M > RS	
	β	<i>p</i>	β	<i>p</i>	β	<i>p</i>	β	<i>p</i>	β	<i>p</i>
<i>Perceived Regard</i>										
Actor effect	.06	.22	.18	<.001	.07	.16	-.45	<.001	.25	<.001
Partner effect	.00	.97	.02	.62	.08	.17	-.06	.14	.29	<.001
<i>Perception of Partner</i>										
Actor effect	.02	.72	.18	<.001	.01	.91	.07	.89	.44	<.001
Partner effect	-.02	.60	.09	.07	.07	.12	-.32	<.001	.21	<.001

Note. Effects are presented as standardized coefficients (β). SE = Self-esteem, N = Neuroticism, M = Mediator, RS = Relationship Satisfaction. Effects are equal for men and women. Coefficients displayed in bold are significant ($p < .05$).

SELF-ESTEEM, RELATIONSHIP SATISFACTION AND PERCEPTION

Table 2

Results of the Cross-Lagged Actor-Partner Interdependence Mediation Models with Self-esteem, Neuroticism, and Relationship Satisfaction as Predictor, Self-Esteem and Relationship Satisfaction as Outcome Variables, and Perceived Regard and Perception of Partner as Mediator.

Effects	SE > RST2		SE > M		M > RS2		RS > SET2		RS > M		M > SET2		N > RST2		N > SET2		N > M	
	β	<i>p</i>	β	<i>p</i>	β	<i>p</i>	β	<i>p</i>	β	<i>p</i>	β	<i>p</i>	β	<i>p</i>	β	<i>p</i>	β	<i>p</i>
<i>Perceived Regard</i>																		
Actor effect	.01	.78	.31	<.001	.05	.31	.03	.66	.13	.05	-.04	.39	-.05	.31	-.10	.03	-.21	.001
Partner effect	.06	.13	.00	.99	-.03	.76	.12	.08	.07	.34	-.05	.31	.04	.37	.01	.77	-.11	.08
<i>Perception of Partner</i>																		
Actor effect	.02	.58	.15	.007	.01	.83	.06	.41	.47	<.001	-.08	.13	-.05	.25	-.10	.03	-.06	.34
Partner effect	.05	.19	.14	.02	.01	.90	.13	.06	-.02	.81	-.05	.37	.04	.36	.01	.81	-.16	.003

Note. Effects are presented as standardized coefficients. SE = Self-esteem, M = Mediator, RS = Relationship Satisfaction, N = Neuroticism, T2 = Time point 2. Effects are equal for men and women. Coefficients displayed in bold are significant ($p < .05$).

SELF-ESTEEM, RELATIONSHIP SATISFACTION AND PERCEPTION

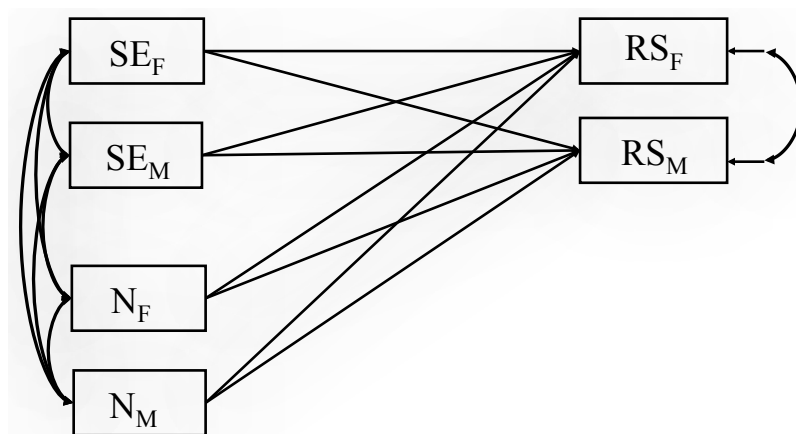


Figure 1. Actor-partner interdependence model for the association between self-esteem (SE) and relationship satisfaction (RS) in female (F) and male (M) partners, controlling for both partners' neuroticism (N) levels..

SELF-ESTEEM, RELATIONSHIP SATISFACTION AND PERCEPTION

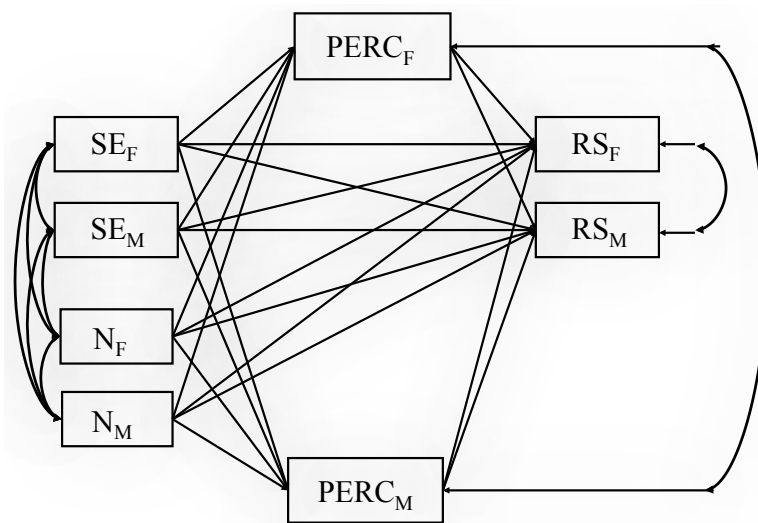


Figure 2. Actor-partner interdependence mediation model for the association between self-esteem (SE) and relationship satisfaction (RS) mediated through perceived regard or perceptual processes in female (F) and male (M) partners, controlling for both partners' neuroticism (N) levels.

SELF-ESTEEM, RELATIONSHIP SATISFACTION AND PERCEPTION

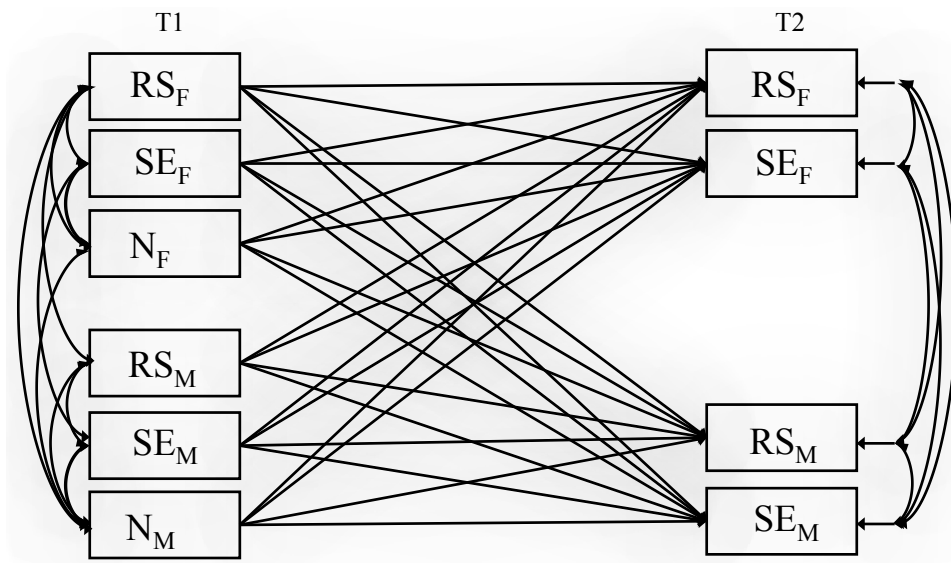


Figure 3. Cross-lagged actor-partner interdependence model for the associations between self-esteem (SE) and relationship satisfaction (RS) in female (F) and male (M) partners, controlling for both partners' neuroticism (N) levels at T1.

SELF-ESTEEM, RELATIONSHIP SATISFACTION AND PERCEPTION

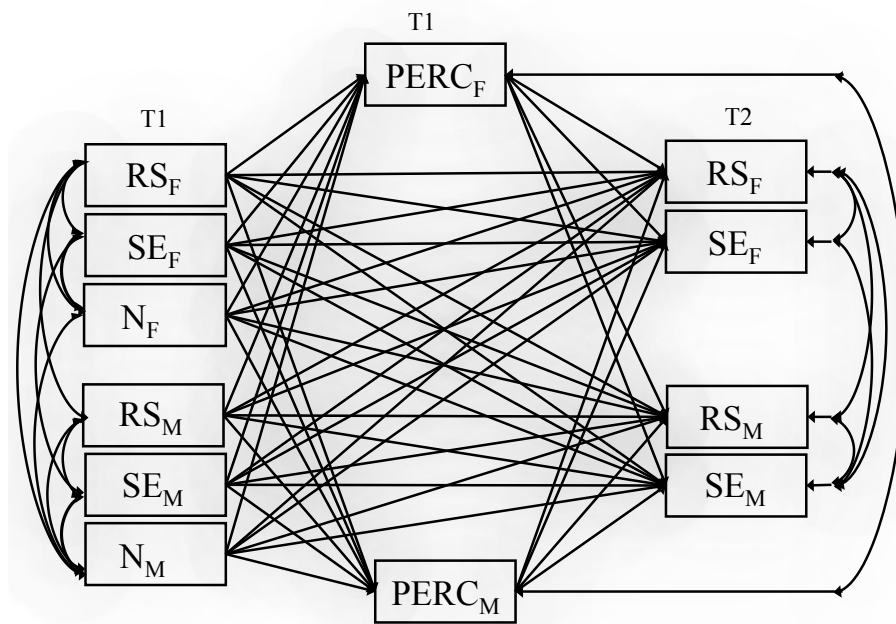


Figure 4. Cross-lagged actor-partner interdependence mediation model for the association between self-esteem (SE) and relationship satisfaction (RS) mediated through perceived regard or perception of partner (PERC) at T1 or T2 (alternative models) in female (F) and male (M) partners.

APPENDIX D: Article 4

Weidmann, R., Ledermann, T., & Grob, A. (2016). Big Five traits and relationship satisfaction: The mediating role of self-esteem. *Journal of Research in Personality*. doi:10.1016/j.jrp.2016.06.001

Big Five traits and relationship satisfaction: The mediating role of self-esteem

Rebekka Weidmann

University of Basel

Thomas Ledermann

Utah State University

Alexander Grob

University of Basel

Author Note

Rebekka Weidmann, Department of Psychology, University of Basel, Switzerland

Thomas Ledermann, Department of Psychology, Utah State University, USA

Alexander Grob, Department of Psychology, University of Basel, Switzerland

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Correspondence concerning this article should be addressed to Rebekka Weidmann, Department of Psychology, University of Basel, Missionsstrasse 62, 4055 Basel, Switzerland.
E-mail: rebekka.weidmann@unibas.ch

Running Head: BIG FIVE TRAITS, SELF-ESTEEM AND RELATIONSHIP SATISFACTION 2

Abstract

This study examined the mediating role of self-esteem in the association between Big Five traits and relationship satisfaction. Using data of 237 heterosexual couples and the Actor-Partner Interdependence Mediation Model (APIMeM), self-esteem mediated the association between Big Five traits and relationship satisfaction. We also tested the directionality of the association using longitudinal data of 141 couples. Results indicate that only agreeableness (and neuroticism marginally) predicts relationship satisfaction two years later, but relationship satisfaction predicted partner's extraversion. Further, significant indirect effects emerged between relationship satisfaction, self-esteem, and later neuroticism. These results underline the importance of studying Big Five traits and self-esteem conjointly when studying relationship satisfaction. Furthermore, testing for alternative longitudinal associations elucidates the role of romantic relationships in personality development.

Word count: 120

Keywords: Big Five, Personality, Self-Esteem, Relationship Satisfaction, Couples, Actor-Partner Interdependence Mediation Model.

Running Head: BIG FIVE TRAITS, SELF-ESTEEM AND RELATIONSHIP SATISFACTION 3

Big Five traits and relationship satisfaction: The mediating role of self-esteem

A growing body of research has focused on the link between personality traits and romantic relationships providing evidence that neuroticism is negatively linked to relationship satisfaction whereas extraversion, agreeableness, and conscientiousness are positively associated with relationship satisfaction (Dyrenforth, Kashy, Donnellan, & Lucas, 2010; Solomon & Jackson, 2014). For openness to experience, evidence is mixed (Dyrenforth et al., 2010; Solomon & Jackson, 2014). Big Five traits have also been found to be predictive of an individual's self-esteem (Robins, Tracy, Trzesniewski, Potter, & Gosling, 2001), which is also associated with the relationship satisfaction of couples (Erol & Orth, 2013). The current study focuses on the association of the Big Five traits, self-esteem, and relationship satisfaction in romantic couples and proposes that the link between the Big Five traits and relationship satisfaction is mediated by self-esteem. For that purpose the Actor–Partner Interdependence Mediation Model (APIMeM) was used to examine both intrapersonal and interpersonal associations, known as actor and partner effects.

Big Five and Romantic Relationships

Personality has been a prominently studied predictor of relationship outcomes. The vulnerability-stress-adaption model of Karney and Bradbury (1995) postulates that personality can be seen as vulnerabilities in the context of romantic relationships. On the one hand, the personality of both partners can act as stressors in the relationship, negatively contributing to relationship quality and satisfaction. On the other hand, partners' personalities can be an adaptive or maladaptive tool when dealing with stress. The Big Five trait that has most consistently been linked to relationship satisfaction is neuroticism (Dyrenforth et al., 2010; Karney & Bradbury, 1995; Solomon & Jackson, 2014). Research on romantic relationships, for instance, suggests that individuals high in neuroticism interpret ambiguous cues in their relationship more negatively (Finn, Mitte, & Neyer, 2013). Furthermore, agreeableness, conscientiousness and extraversion are positively linked to relationship

Running Head: BIG FIVE TRAITS, SELF-ESTEEM AND RELATIONSHIP SATISFACTION 4

satisfaction (Dyrenforth et al., 2010). Highly agreeable, conscientious, and extraverted persons show adaptive coping styles such as actively coping and positively reevaluating stressful situations (Watson & Hubbard, 1996). These processes might play a crucial role in romantic relationships. Finally, openness to experience shows mixed results concerning relationship outcomes (Dyrenforth et al., 2010; Karney & Bradbury, 1995; Solomon & Jackson, 2014). Although, it has long been suggested that personality traits predict relationship outcomes (Karney & Bradbury, 1995), more recent studies have also shown that satisfaction in general as well as entering romantic relationships might contribute to personality development (Soto, 2014; Neyer & Lehnart, 2007).

Self-Esteem and Romantic Relationships

Aside from the Big Five traits, self-esteem has consistently been linked to relationship satisfaction as well. Evidence suggests that the ascription of worth to one self is associated with the degree of happiness reported in romantic relationships. A recent study using the APIM approach reports positive actor and partner effects in the association of self-esteem and relationship satisfaction (Erol & Orth, 2013). Several theoretical assumptions guide research on self-esteem and satisfaction in romantic couples. First, the sociometer theory states that self-esteem can be seen as a sociometer monitoring acceptance or rejection in interpersonal relationships (Leary & Baumeister, 2000). Thus, relationship satisfaction should foster partners' self-esteem over time, whereas dissatisfaction should reduce partners' self-esteem in the long-term. Second, the dependency regulation model postulates a reverse direction. Romantic partners regulate their dependency on their partners in a self-protecting way contingent on the level of felt security (Murray, Holmes, & Griffin, 2000; Murray, Holmes, & Collins, 2006). Felt security reflects the belief that the partner is responsive and committed to the self (Murray, Holmes, Griffin, Bellavia, & Rose, 2001) and is positively linked to self-esteem. Thus, individuals with low self-esteem experience less felt security, perceive themselves through their partner's eyes less positively, which results in lower relationship

Running Head: BIG FIVE TRAITS, SELF-ESTEEM AND RELATIONSHIP SATISFACTION 5

satisfaction (Murray et al., 2000). Finally, according to the self-broadcasting theory, higher self-esteem and its consequent behavior might lead to increased popularity in the social realm (Srivastava & Beer, 2005). Thus, with respect to couples, an individual's self-esteem might contribute to increasing relationship satisfaction in the partner because the partner might be satisfied with the individual's behavior. Longitudinal evidence on the direction between self-esteem and relationship satisfaction yields inconsistent findings. A recent study for instance found interpersonal (partner) effects of relationship satisfaction on self-esteem two years later (Schaffhuser, Wagner, Lüdtkke, & Allemand, 2014). Another study found that self-esteem predicted relationship satisfaction over a time span of 12 years, but relationship satisfaction did not predict self-esteem (Orth, Robins, & Widaman, 2012). Finally, evidence showed that self-esteem and relationship quality are bi-directionally intertwined over a period of three years (Mund, Finn, Hagemeyer, Zimmermann, & Neyer, 2015).

Big Five and Self-Esteem

Research on Big Five traits and on self-esteem in romantic couples has contributed greatly to the knowledge of how personality characteristics are linked to relationship functioning of both partners. However, these two lines of research have often been conducted in a parallel rather than a joint way (Robins et al., 2001). Nevertheless, theoretical and empirical evidence link these relationship predictors into a unified framework. Big Five traits and self-esteem have been conceptualized as core and surface characteristics and it has been argued that core characteristics develop prior to and are associated with surface characteristics. Moreover, surface characteristics might be more strongly connected to the social context (Kandler, Zimmermann, & McAdams, 2014). Further, according to the New Big Five model postulated by McAdams and Pals (2006) dispositional traits (e.g., Big Five traits), characteristic adaptations (e.g., self-esteem), and the social ecology of everyday life (e.g., romantic relationships) are connected reciprocally where dispositional traits are bi-directionally linked to characteristic adaptations and everyday life and characteristic adaptations are most strongly

Running Head: BIG FIVE TRAITS, SELF-ESTEEM AND RELATIONSHIP SATISFACTION 6

linked to daily behavior. This assumption of bidirectional effects is in contrast to the Five-Factor model postulating that basic tendencies such as Big Five traits dynamically influence the self-concept and not the other way around (McCrae & Costa, 1999).

Empirical evidence corroborates the link between Big Five traits and self-esteem. More specifically, neuroticism and extraversion are most strongly linked to self-esteem, whereas agreeableness, conscientiousness, and openness show small correlations with self-esteem (Robins et al., 2001). These associations could be based on the benefits certain personality traits entail. More specifically, personality traits have been found to be linked to a myriad of life outcomes, including identity formation (Ozer & Benet-Martinez, 2006), positive affect, and social support, which in turn are associated with self-esteem (Luyckx et al., 2013; Swickert, Hittner, Kitos, & Cox-Fuenzalida, 2004). However, to our knowledge, the mediational role of self-esteem on the association between Big Five traits and relationship satisfaction has not yet been explored in the context of romantic relationship. It has been suggested that self-esteem might “offer clues to the mechanisms linking the Big Five to these outcomes” such as relationship satisfaction (Robins et al., 2001, p. 2). The current study examines the role of self-esteem as a mediator of the association between the Big Five personality traits and relationship satisfaction in couples.

The Present Study

Using dyadic data and the Actor-Partner Interdependence Model (e.g., Kenny, 1996), the present research investigates whether partners’ self-esteem mediates the association between Big Five traits and relationship satisfaction in romantic couples. We do not expect self-esteem to fully explain the association between Big Five traits and relationship satisfaction. Rather, we predict partial mediations, due to the evidence that many other processes have also been found to mediate the link of personality traits and relationship outcomes (e.g. Finn, Mitte, & Neyer, 2013; Vater & Schröder-Abé, 2015). In addition, we test two longitudinal models to uncover the directionality between Big Five traits, self-esteem, and relationship satisfaction in

Running Head: BIG FIVE TRAITS, SELF-ESTEEM AND RELATIONSHIP SATISFACTION 7

couples. The first model will test whether personality, mediated by self-esteem, longitudinally predicts relationship satisfaction. The second model investigates whether relationship satisfaction through self-esteem contributes to personality.

Method

Participants

We used data from a large-scale study entitled *Co-Development in Personality*. The aim of this study is to investigate personality development in close social relationships. The sample of the present study included data of both partners from 237 heterosexual couples at the first measurement point. Further, 141 couples participated at a second time point two years apart representing the sample for the longitudinal analyses. Participants lived in urban, suburban and rural regions of German-speaking Switzerland. Mean age was 48.4 years ($SD = 19.6$) for women and 50.7 years ($SD = 20.1$) for men. The majority of couples were married (70.9%) and the average relationship duration was 23.5 years ($SD = 17.6$).

Measures

Big Five personality traits.

Personality traits were assessed using the 45-item German version of the Big Five Inventory (John & Srivastava, 1999). Participants rated their personality on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Cronbach's alpha for neuroticism, agreeableness, conscientiousness, extraversion and openness were .85, .71, .81, .84, and .76, respectively.

Self-esteem.

We measured participants' self-esteem with the German version of the Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965; von Collani & Herzberg, 2003). Participants had to rate items like "I feel that I have a number of good qualities" on a four-point scale ranging

Running Head: BIG FIVE TRAITS, SELF-ESTEEM AND RELATIONSHIP SATISFACTION 8

from 1 (*strongly disagree*) to 4 (*strongly agree*). The RSES encompasses 10 items with an alpha reliability of .86.

Relationship satisfaction.

To assess relationship satisfaction the widely used Relationship Assessment Scale (Hendrick, 1988) was employed, translated into German (Sander & Böcker, 1993). Seven items were rated on a five-point scale ranging from 1 (*low satisfaction*) to 5 (*high satisfaction*) on items like “How well does your partner meet your needs?”. Alpha reliability was .91.

Statistical Approach

To examine the associations between Big Five traits, self-esteem, and relationship satisfaction and to take into account the interdependent nature of the data we used Actor-Partner Interdependence (APIM; e.g. Kenny, 1996) and Actor-Partner Interdependence Mediation Models (APIMeM; Ledermann, Macho, & Kenny, 2011) to examine intrapersonal (actor) effects and interpersonal (partner) effects of romantic partners (see Figure 1). We followed three lines of analyses to test concurrent and longitudinal effects. In the first models, we tested whether Big Five traits predict relationship satisfaction concurrently (APIM) and self-esteem as mediator (APIMeM, see Figure 1). The second models examined these assumptions longitudinally by modelling the prediction of Big Five traits on relationship satisfaction two years later, controlling for relationship satisfaction at time point 1 (APIM) and by testing the mediation of self-esteem at time point 1 (APIMeM). The third models further investigated whether relationship satisfaction predicted Big Five traits longitudinally above and beyond their stability (APIM) and whether self-esteem at time point 1 mediates these longitudinal associations (APIMeM).

To analyze the data the lavaan package in R was employed (Rosseel, 2012). The basic models are saturated with zero degrees of freedom (*df*). Subsequently, we tested whether imposing constraints for effects to be equal across gender would worsen the model fit. A

Running Head: BIG FIVE TRAITS, SELF-ESTEEM AND RELATIONSHIP SATISFACTION 9

Tucker-Lewis index (TLI) and a comparative fit index (CFI) greater than .95 and root-mean-square error of approximation (RMSEA) below .06 were considered a good model fit (Hu & Bentler, 1999). We evaluated nested model comparisons with the test of small difference in fit which is less sensitive to sample size than the chi-square ratio test (MacCallum, Browne, & Cai, 2006). Indirect effects were tested with bias-correct bootstrap confidence intervals (CI) based on 5,000 bootstrap samples.

Power Analyses

We conducted power analyses for the APIM using the program written by Ackerman and Kenny (Ackerman, Ledermann, & Kenny, unpublished). Given earlier findings on Big Five traits and relationship satisfaction (e.g., Dyrenforth et al., 2010; Solomon & Jackson, 2014), we assumed a small to medium actor effect (standardized estimate = .15) and a small partner effects (standardized estimate = .10). With 237 couples, the power to detect these effects is .94 and .64, respectively. Unfortunately, there is yet a tool be published to analyze the power of a longitudinal APIM, however, due to the reduced sample size and the added stability controls we estimate that the longitudinal models are able to detect medium to large effects only.

Results

Table 1 summarizes the means, standard deviations and bivariate correlations between the variables of the cross-sectional models. Women and men were similar in their means with the exception of neuroticism where women's mean was about two-thirds standard deviations higher than men's means. As can be seen, the correlations between the Big Five traits were all smaller than .50 in magnitude and the correlations between partners were between small and medium in size with the exception of the correlation of relationship satisfaction, which was large.

Concurrent APIM and APIMeM

Running Head: BIG FIVE TRAITS, SELF-ESTEEM AND RELATIONSHIP SATISFACTION 10

We first estimated simple APIMs for each Big Five trait and relationship satisfaction as outcome and tested whether the actor and partner effects differed across gender. Imposing gender-equal constraints in the APIMs and APIMeMs on the actor and the partner effects did not significantly worsen the fit of the models using the test of small difference in fit ($df=2$ and $df=6$, $p > .05$). Moreover, all models assuming equal actor effects and equal partner effects were consistent with the data (CFI $> .98$, TLI $> .96$, RMSEA $< .07$). The direct effects of the Big Five traits on relationship satisfaction yielded significant actor and partner effects (see Table 2). Neuroticism was negatively, agreeableness, and conscientiousness was positively associated with relationship satisfaction. Further, significant partner effects emerged for neuroticism, agreeableness, and openness to new experiences. Individuals with more neurotic and open partners reported less relationship satisfaction, whereas individuals with partners high in agreeableness reported higher relationship satisfaction. Multiple R ranged between .08 to .21 for female partners and .09 to .24 for male partners.

Next, we added self-esteem as mediator to each APIM with relationship satisfaction as outcome. Table 3 displays the results for the cross-sectional APIMeMs. The direct effects between Big Five traits and relationship were comparable to the simple APIMs with one exception. The direct effects of neuroticism on relationship satisfaction were not significant. Further, substantial actor effects were found for all Big Five traits on self-esteem signifying that lower neuroticism, higher agreeableness, conscientiousness, extraversion, and openness was associated with higher self-esteem. In addition, a partner effect between extraversion and self-esteem was found, reflecting that if one partner reported higher extraversion, the other partner had higher self-esteem. Finally, self-esteem yielded positive actor effects on relationship satisfaction, and in the cases of conscientiousness, extraversion, and openness also substantial partner effects.

Table 4 shows the point and interval estimates of the indirect effects. Self-esteem was significant mediator of the actor effects for all Big Five traits and relationship satisfaction

Running Head: BIG FIVE TRAITS, SELF-ESTEEM AND RELATIONSHIP SATISFACTION 11

(actor-actor indirect effects). Further, significant actor-partner indirect effects (i.e., predictor and mediator are from one partner and outcome from the other partner) emerged for conscientiousness, extraversion, and openness to experience as predictors. With respect to actor-actor indirect effects, the proportion of the total effect¹ that is mediated was 54.9% in neuroticism, 23.3% in agreeableness, 23% in conscientiousness, 100% in extraversion, and 92.3% in openness to experience. With regard to the partner effects, the proportion of the total effect that is mediated through actor-partner indirect effects is 177.8% in conscientiousness, 136.3% in extraversion, and 22.4% in openness to experience. Multiple *R* for these models ranged from .16 to .50 for female self-esteem and from .20 to .49 for male self-esteem. Further, multiple *R* for relationship satisfaction ranged from .20 to .26 for female partners and from .21 to .28 for male partners.

Longitudinal APIM and APIMeM with Big Five traits as predictors

The means, standard deviations and bivariate correlations for women and men for the variables used in the longitudinal models are displayed in table 5. In the second set of models, we tested longitudinal effects with Big Five traits predicting relationship satisfaction and mediated by self-esteem. Imposing gender-equality constraints on the actor effects and the partner effects did not worsen the model fits (APIM: $df = 4$ and APIMeM: $df = 10$, $p > .05$). Further, these simpler models showed a good fit (CFI = 1.00, TLI = 1.00, RMSEA < .01). We first estimated a simple APIM for each Big Five trait measured at two points in time. The actor effects of relationship satisfaction at the first time point and second time point, which reflect stability over time, ranged from .70 to .71 and were all significant. The partner effects reflect the influence between partners in relationship satisfaction and ranged from .16 to .17. Results of Big Five traits predicting relationship satisfaction two years later yielded a significant actor effect for agreeableness and trend-level significant actor effect for neuroticism (see table 6). Multiple *R* ranged from .83 to .84 for females and was .81 for males.

Running Head: BIG FIVE TRAITS, SELF-ESTEEM AND RELATIONSHIP SATISFACTION 12

Finally we extended these models by adding self-esteem as mediator at time 1. In all APIMeMs, no indirect effect was significant (see table 7 and 8). Multiple R ranged from .28 to .47 for female self-esteem and from .33 to .48 for male self-esteem. For relationship satisfaction, multiple R was .84 for female relationship satisfaction and ranged from .81 to .82 for male relationship satisfaction.

Longitudinal APIM and APIMeM with relationship satisfaction as predictor

The last set of models used relationship satisfaction measured at time 1 as predictor of Big Five traits measured at time 2 and with self-esteem measured at time 1 as mediator. Setting the paths equal for female and male partners did not worsen the model fit (APIM: $df=4$ and APIMeM; $df=10, p > .05$). Further, these simpler models yielded a good fit (CFI $> .99$, TLI $> .99$, RMSEA $< .05$). Big Five trait stabilities were .62 for neuroticism, .75 for agreeableness, .68 for conscientiousness, .78 for extraversion, and .84 for openness. Significant partner effects of Big Five traits between partners emerged for agreeableness and for extraversion on a marginal level ($b = .08, p = .08$ and $b = -.07, p = .06$, respectively). In the simple longitudinal APIM, relationship satisfaction did not predict Big Five traits over time, with the exception of a significant partner effect for extraversion (see table 6). Thus, if one partner was satisfied with the relationship, two years later, the other partner reported higher extraversion. The multiple R of these longitudinal model ranged from .70 to .83 for female and from .71 to .82 for male.

Further, we tested whether indirect effects emerged between relationship satisfaction and self-esteem at time point 1 and Big Five traits two years later. Similar to the cross-sectional APIM, relationship satisfaction and self-esteem were intrapersonally associated. Further, self-esteem predicted a person's neuroticism two years later resulting in significant actor-actor indirect effect (see table 7 and 8). The total indirect effects were 100% of the total effect. Multiple R for female self-esteem ranged from .28 to .48, and for male self-esteem

Running Head: BIG FIVE TRAITS, SELF-ESTEEM AND RELATIONSHIP SATISFACTION 13

from .33 to .48. Further, for female relationship satisfaction multiple R varied from .72 to .84 and for male relationship satisfaction from .72 to .81.

Discussion

The aim of the current study was to examine the associations between personality traits, self-esteem, and relationship satisfaction in a combined model and to test the directionality of effects between personality traits and relationship satisfaction. First, we found that a person's neuroticism, agreeableness, and conscientiousness were concurrently linked to his or her own relationship satisfaction. Second, our evidence suggests associations between a person's neuroticism, agreeableness, and openness and the partner's relationship satisfaction. In contrast to previous results (Dyrenforth et al., 2010; Solomon & Jackson, 2014), no direct link between extraversion and relationship satisfaction was found. Moreover, the partner effect between openness to experience and relationship satisfaction was negative. Openness to experience has been theorized to have the potential to both positively and negatively affect relationship satisfaction. On the one hand, openness to experience can help partners escape boredom in their relationship whereas on the other hand, openness to experience can be linked to the extent individuals are open to potential partners outside the relationship (Solomon & Jackson, 2014).

With regard to the mediating role of self-esteem, we found that self-esteem mediated actor effects of all Big Five traits and relationship satisfaction. Neuroticism was most strongly related to a person's own self-esteem, which is in line with previous research (Robins et al., 2001), followed by extraversion, conscientiousness, and agreeableness. Even though no significant direct effects initially emerged for extraversion and actor effects in openness, we tested and identified significant indirect effects. The results of our study suggest that extraversion is not directly linked to relationship satisfaction but to self-esteem, which, in turn, is linked to relationship satisfaction. Extraversion was not only related to a person's own

Running Head: BIG FIVE TRAITS, SELF-ESTEEM AND RELATIONSHIP SATISFACTION 14

self-esteem but also to the partner's self-esteem. We speculate that the positive affect of extraverted persons could lead their partners feeling more positively about themselves. Further, self-esteem and extraversion share an affective component that might link them more closely (Robins et al., 2001). However, the effect was small in size and replication studies are needed to confirm its validity. Finally, in the case of conscientiousness, extraversion, and openness to experience significant indirect actor-partner effects emerged. In other words, conscientiousness, extraversion, and openness to experience were linked to self-esteem, which in turn was positively associated with the relationship satisfaction of the partner. With the exception of neuroticism, the direct effects between Big Five traits and relationship satisfaction were significant in the APIMeM suggesting partial mediation. Neuroticism was strongly tied to self-esteem and thus its association with relationship satisfaction was non-significant with self-esteem as mediating variable in the model.

The longitudinal models could not replicate the cross-sectional results. Only agreeableness and neuroticism – however, on a marginal significance level — predicted relationship satisfaction intrapersonally. Agreeableness and neuroticism have been most strongly associated with relationship satisfaction in previous studies (Dyrenforth et al., 2010; Solomon & Jackson, 2014) and might be those traits that facilitate or complicate a relationship as postulated in the vulnerability-stress-adaption model by Karney & Bradbury (1995). Agreeableness on the one hand facilitates relationships due to its link to adaptive coping strategies (Watson & Hubbard, 1996) and might therefore represent a strength, rather than a vulnerability, in the romantic context. In contrast, neuroticism might complicate a relationship due to interpretation biases that lead to lower relationship satisfaction (Finn et al., 2013).

Further, with regard to relationship satisfaction as predictor of personality, a substantial partner effect was found between relationship satisfaction and extraversion measured two years later suggesting that if the partner was more satisfied with the

Running Head: BIG FIVE TRAITS, SELF-ESTEEM AND RELATIONSHIP SATISFACTION 15

relationship in general, the other partner was more extraverted later. It might be that the partner's satisfaction fosters trust in one's own social competence and increases positive affect promoting higher levels of extraversion. Further, significant actor-actor indirect effects of self-esteem in the prediction of relationship satisfaction and neuroticism emerged. Signifying that higher relationship satisfaction was concurrently linked to higher self-esteem, which in turn predicted lower neuroticism two years later. Again, we caution to interpret this single effect in the myriad of models tested as conclusive fact. However, if replication studies corroborate the current finding, it would underline the importance of social relationships in the personality development of individuals.

The present study has employed a dyadic approach to investigate the mediating role of self-esteem in the association between Big Five traits and relationship satisfaction. However, the longitudinal analyses were based on a reduced sample with limited statistical power to detect small effects. Further, we used self-reports to assess personality characteristics and relationship satisfaction. Social desirability or narcissistic tendencies might bias the current associations (Robins et al., 2001). Observational and partner-reported data on personality could complement the current findings and control for shared method variance (Orth, 2013). Moreover, relationship processes that are interpersonal in nature – in contrast to intrapersonal processes such as self-esteem – might in addition contribute to the question of how personality and relationship outcomes are associated, as has been examined in recent articles of Finn et al. (2013) and Vater and Schröder-Abé (2015).

The longitudinal analyses of the current study spanned two years. On the one hand, it would be desirable to assess daily reports of couples to investigate the interplay of personality traits, self-esteem, and relationship satisfaction on the micro-level. On the other hand, longitudinal studies examining couples for longer time spans would enlighten the long-term consequences of romantic relationships for satisfaction and personality development. Finally, with two time points we were not able to test the directionality of effects between self-esteem

Running Head: BIG FIVE TRAITS, SELF-ESTEEM AND RELATIONSHIP SATISFACTION 16

and relationship satisfaction. However, a study using the same sample found that relationship satisfaction interpersonally predicted self-esteem two years later, but self-esteem did not predict relationship satisfaction (Schaffhuser et al., 2014). We were able to replicate the latter result that self-esteem longitudinally predicts relationship satisfaction. Future longitudinal studies need to address the directionality of the association between self-esteem and relationship satisfaction to clarify the inconsistencies in the literature (Mund et al., 2015; Orth et al., 2012; Schaffhuser et al., 2014).

Finally, we acknowledge that a myriad of possible alternative mediating processes need to be further researched. We propose that not only intrapersonal mediators, such as self-esteem, but interpersonal behavioral, cognitive, emotional, and motivational processes potentially explain the interplay of partners' personality and relationship satisfaction. Recent studies have provided evidence of cognitive processes, for instance interpretation biases (Finn et al., 2013), and of emotional and behavioral processes, such as emotion regulation and interpersonal behavior during conflict (Vater & Schröder-Abé, 2015) that explain part of why personality and relationship outcomes are closely tied. Thus, future studies need to address intra- as well as interpersonal processes to further understand the dynamic interplay of personality and relationship outcomes in the romantic context.

In sum, self-esteem plays an important explanatory role in the concurrent associations between Big Five personality traits and satisfaction in romantic couples. Important theoretical implications can be drawn from the current study. As postulated in the tripartite model of McAdams and Pals (2006) both directionalities have to be taken into account when studying traits, characteristics adaptations and the daily social life of couples. Other theoretical models, such as the Five-Factor model posit no effect of characteristic adaptations or the self-concept on basic tendencies such as the Big Five traits (McCrae & Costa, 1999). However, the current evidence suggests that self-esteem longitudinally predicts neuroticism. Thus, further studies are needed to clarify the interplay between personality traits, self-esteem, and relationship

Running Head: BIG FIVE TRAITS, SELF-ESTEEM AND RELATIONSHIP SATISFACTION 17

satisfaction. It is important to examine personality traits and self-esteem together to distinguish their separate effects. In addition, our results demonstrate the bi-directional association between Big Five traits and relationship satisfaction and thus underline on the one hand the role of personality for romantic relationships and on the other hand romantic relationships for personality development.

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Running Head: BIG FIVE TRAITS, SELF-ESTEEM AND RELATIONSHIP SATISFACTION 19

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Running Head: BIG FIVE TRAITS, SELF-ESTEEM AND RELATIONSHIP SATISFACTION 22

Footnotes

¹ The proportion of the indirect effect relative to the total effect was calculated from $ab/(ab)+c'$.

Running Head: BIG FIVE TRAITS, SELF-ESTEEM AND RELATIONSHIP SATISFACTION

Table 1

Descriptive statistics and correlations of Big Five traits, self-esteem, and relationship satisfaction in the cross-sectional analyses

Variables	Women		Men		Correlations						
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7
1. Neuroticism	2.91	0.76	2.45	0.65	.15*	-.41***	-.31***	-.32***	-.08	-.53***	-.05
2. Agreeableness	3.90	0.48	3.78	0.48	-.35***	.15*	.21**	.05	.06	.25***	.13*
3. Conscientiousness	4.04	0.59	3.95	0.58	-.25***	.18**	.17**	.27***	.09	.39***	.14*
4. Extraversion	3.73	0.71	3.53	0.66	-.24***	.12 [†]	.23**	.15*	.31***	.37***	.05
5. Openness	3.66	0.54	3.68	0.58	.03	.04	.13*	.35***	.21**	.21**	-.11 [†]
6. Self-esteem	3.27	0.49	3.44	0.41	-.46***	.32***	.36***	.41**	.16*	.13*	.09
7. Rel. satisfaction	4.21	0.66	4.29	0.60	-.21**	.21**	.21**	.10	.01	.26***	.67***

Notes. *N* = 237 couples. Correlations of female partners are above the diagonal. Correlations of male partners are below the diagonal.

Correlations between partners are on the diagonal.

***p* < .01, **p* < .05

Running Head: BIG FIVE TRAITS, SELF-ESTEEM AND RELATIONSHIP SATISFACTION

Table 2

Cross-sectional direct effects of Big Five traits predicting relationship satisfaction

	Actor effect		Partner effect	
	<i>b</i>	95% CI	<i>b</i>	95% CI
Neuroticism	-.11**	[-.19, -.03]	-.09*	[-.17, -.02]
Agreeableness	.20***	[.09, .31]	.19**	[.08, .30]
Conscientiousness	.19***	[.10, .28]	-.02	[-.11, .07]
Extraversion	.06	[-.02, .14]	.04	[-.04, .12]
Openness	-.03	[-.13, .06]	-.10*	[-.20, -.01]

Notes. *** $p < .001$, ** $p < .01$, * $p < .05$

Running Head: BIG FIVE TRAITS, SELF-ESTEEM AND RELATIONSHIP SATISFACTION

Table 3

Cross-sectional direct effects between Big Five traits, self-esteem, and relationship satisfaction

Trait	Big Five traits predicting relationship satisfaction					
	Big Five traits → Satisfaction			Big Five traits → Self-esteem		
	Actor effect	95% CI	Partner effect	95% CI	Actor effect	95% CI
Neuroticism	<i>b</i> -0.05	[-.14, .04]	<i>b</i> -.06	[-.15, .02]	<i>b</i> -.32***	[-.37, -.27]
Agreeableness	.16**	[.04, .27]	.17**	[.05, .28]	.27***	[.19, .35]
Conscientiousness	.15**	[.05, .25]	-.07	[-.16, .03]	.28***	[.22, .35]
Extraversion	.00	[-.09, .09]	-.01	[-.10, .08]	.25***	[.19, .30]
Openness	-.07	[-.17, .03]	-.13**	[-.23, -.04]	.14***	[.07, .21]

Notes. *** $p < .001$, ** $p < .01$, * $p < .05$

Running Head: BIG FIVE TRAITS, SELF-ESTEEM AND RELATIONSHIP SATISFACTION

Table 4

Cross-sectional indirect effects between Big Five traits, self-esteem, and relationship satisfaction

Trait	Big Five traits predicting relationship satisfaction							
	Actor-Actor		Actor-Partner		Partner-Actor		Partner-Partner	
	<i>b</i>	95% BC CI	<i>b</i>	95% BC CI	<i>b</i>	95% BC CI	<i>b</i>	95% BC CI
Neuroticism	-.06**	[-.10, -.02]	-.03	[-.07, .02]	.00	[-.01, .01]	.00	[-.004, .01]
Agreeableness	.05**	[.01, .09]	.03	[-.01, .06]	-.01	[-.02, .01]	.00	[-.01, .01]
Conscientiousness	.05*	[.01, .08]	.05*	[.01, .08]	.00	[-.01, .01]	.00	[-.01, .01]
Extraversion	.06*	[.02, .09]	.04*	[.003, .07]	.01	[-.001, .03]	.01	[-.002, .02]
Openness	.03**	[.01, .06]	.02*	[.003, .04]	.00	[-.01, .02]	.00	[-.01, .02]

Notes. BC CI = bias-corrected confidence interval.** $p < .01$, * $p < .05$

Running Head: BIG FIVE TRAITS, SELF-ESTEEM AND RELATIONSHIP SATISFACTION

Table 5

Descriptive statistics and correlations of Big Five traits, self-esteem, and relationship satisfaction in the longitudinal analyses

Variables	Women		Men		Correlations													
	M	SD	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Neur T1	2.98	.73	2.44	.64	.17*	-.41***	-.32***	-.27**	-.04	-.51***	-.10	.67***	-.39***	-.29**	-.24**	-.02	-.41***	-.22*
2. Agree T1	3.89	.49	3.82	.46	-.28**	.16†	.28**	.06	.08	.27**	.25**	-.40***	.75***	.14	.01	.09	.26**	.26**
3. Cons T1	4.03	.60	3.97	.54	-.18*	.17*	.27**	.33***	.06	.41**	.27**	-.30**	.24**	.77**	.29**	.06	.33**	.23**
4. Extr T1	3.72	.73	3.47	.69	-.19*	.14†	.15†	.19*	.38***	.41***	.04	-.28**	.08	.27**	.83***	.35***	.35***	.10
5. Open T1	3.69	.54	3.65	.60	.05	.05	.13	.40**	.28**	.22*	-.11	-.14†	.16†	.11	.26**	.82***	.20*	-.08
6. RSES T1	3.26	.50	3.46	.41	-.38***	.29**	.28**	.40**	.19*	.22**	.17*	-.53***	.22*	.39***	.36***	.21*	.76***	.23**
7. RAS T1	4.26	.65	4.35	.53	-.17*	.12	.17*	.18*	.09	.29**	.67***	-.14	.12	.22**	.05	-.06	.21*	.83***
8. Neur T2	2.94	.71	2.40	.66	.73***	-.25**	-.22**	-.13	.11	-.37***	-.20*	.13	-.44***	-.34***	-.38***	-.16†	-.55***	-.27**
9. Agree T2	3.87	.49	3.83	.50	-.20*	.73***	.12	.11	.08	.21*	.16†	-.31***	.29**	.31***	.11	.21*	.25**	.12
10. Cons T2	4.02	.55	3.97	.53	-.03	.22*	.73***	.16†	.11	.23**	.25**	-.25**	.25**	.20*	.34***	.18*	.35***	.24**
11. Extr T2	3.67	.68	3.46	.68	-.08	.15†	.09	.80***	.20**	.33***	.23**	-.16†	.17*	.23**	.08	.32***	.41***	.17*
12. Open T2	3.63	.57	3.60	.59	.07	.02	.00	.23**	.82***	.08	.05	.10	.05	.02	.21*	.18*	.17*	-.01
13. RSES T2	3.31	.45	3.49	.39	-.37***	.22**	.27*	.29***	.14	.63***	.30***	-.53***	.33***	.37***	.36***	.11	.26**	.27**
14. RAS T2	4.26	.64	4.32	.56	-.14	.19*	.13	.14	.13	.24**	.79***	-.19*	.24**	.30***	.24**	.05	.35***	.68***

Notes. $N = 141$ couples. Neur = Neuroticism, Agree = Agreeableness, Cons = Conscientiousness, Extr = Extraversion, Open = Openness, RSES = Self-Esteem, RAS = Relationship Satisfaction. T1 for variables of time point one, T2 for variables of time point two. Correlations of female partners are above the diagonal. Correlations of male partners are below the diagonal. Correlations between partners are on the diagonal.

*** $p < .001$, ** $p < .01$, * $p < .05$, † $p < .10$

Running Head: BIG FIVE TRAITS, SELF-ESTEEM AND RELATIONSHIP SATISFACTION

Table 6

Longitudinal direct effects between Big Five traits and relationship satisfaction

Trait	Big Five → Relationship Satisfaction				Relationship Satisfaction → Big Five			
	Actor effect		Partner effect		Actor effect		Partner effect	
	<i>b</i>	95% CI	<i>b</i>	95% CI	<i>b</i>	95% CI	<i>b</i>	95% CI
Neuroticism	-.06 [†]	[-.12, .001]	.01	[-.05, .07]	-.05	[-.17, .08]	-.07	[-.19, .05]
Agreeableness	.09*	[.01, .17]	.03	[-.06, .11]	-.05	[-.13, .04]	.05	[-.04, .13]
Conscientiousness	.01	[-.06, .08]	.00	[-.07, .07]	.03	[-.07, .13]	.04	[-.06, .14]
Extraversion	.03	[-.03, .09]	-.03	[-.08, .03]	-.02	[-.12, .08]	.11*	[.01, .21]
Openness	.03	[-.04, .10]	.04	[-.03, .11]	.00	[-.09, .08]	-.01	[-.10, .07]

Notes. * $p < .05$, [†] $p < .10$

Running Head: BIG FIVE TRAITS, SELF-ESTEEM AND RELATIONSHIP SATISFACTION

Table 7

Longitudinal direct effects between Big Five traits, self-esteem, and relationship satisfaction

Trait	Big Five traits predicting relationship satisfaction									
	Big Five traits → Satisfaction					Big Five traits → Self-esteem				
	Actor effect		Partner effect		95% CI	Actor effect		Partner effect		95% CI
	<i>b</i>	95% CI	<i>b</i>	95% CI		<i>b</i>	95% CI	<i>b</i>	95% CI	
Neuroticism	-.05	[-.11, .02]	.03	[-.04, .09]		-.28***	[-.35, -.21]	.00	[-.07, .07]	
Agreeableness	.08 [†]	[-.01, .16]	.01	[-.07, .10]		.22***	[-.12, .33]	.04	[-.07, .14]	
Conscientiousness	-.01	[-.08, .07]	-.02	[-.09, .06]		.24***	[-.15, .33]	.01	[-.08, .10]	
Extraversion	.01	[-.05, .07]	-.05	[-.11, .01]		.23***	[-.17, .30]	.04	[-.03, .11]	
Openness	.02	[-.05, .09]	.03	[-.04, .11]		.14**	[-.05, .23]	.04	[-.05, .13]	

Trait	Relationship satisfaction predicting Big Five traits									
	Satisfaction → Big Five traits					Satisfaction → self-esteem				
	Actor effect		Partner effect		95% CI	Actor effect		Partner effect		95% CI
	<i>b</i>	95% CI	<i>b</i>	95% CI		<i>b</i>	95% CI	<i>b</i>	95% CI	
Neuroticism	.00	[-.13, .12]	-.09	[-.21, .03]		.16**	[-.06, .26]	-.05	[-.14, .05]	
Agreeableness	-.05	[-.13, .04]	.05	[-.04, .13]		.16**	[-.05, .26]	-.02	[-.12, .08]	
Conscientiousness	.02	[-.07, .12]	.03	[-.07, .13]		.12*	[-.01, .23]	.01	[-.09, .12]	
Extraversion	-.02	[-.12, .08]	.11*	[.004, .21]		.15**	[-.05, .26]	-.02	[-.12, .08]	
Openness	-.02	[-.09, .08]	-.01	[-.10, .08]		.18**	[-.08, .29]	-.01	[-.11, .10]	

Notes. *** $p < .001$, ** $p < .01$, * $p < .05$, [†] $p < .10$

Running Head: BIG FIVE TRAITS, SELF-ESTEEM AND RELATIONSHIP SATISFACTION

Table 8

Indirect effects between Big Five traits, self-esteem, and relationship satisfaction

Trait	Big Five traits predicting relationship satisfaction					
	Actor-Actor		Actor-Partner		Partner-Actor	
	<i>b</i>	95% BC CI	<i>b</i>	95% BC CI	<i>b</i>	95% BC CI
Neuroticism	-.01	[-.04, .02]	-.02	[-.05, .01]	.00	[-.002, .002]
Agreeableness	.01	[-.01, .03]	.01	[-.01, .03]	.00	[-.004, .01]
Conscientiousness	.02	[-.01, .04]	.01	[-.01, .04]	.00	[-.01, .01]
Extraversion	.01	[-.01, .04]	.02	[-.01, .04]	.00	[-.003, .01]
Openness	.01	[-.01, .02]	.01	[-.01, .02]	.00	[-.004, .01]

Relationship satisfaction predicting Big Five traits

Trait	Actor-Actor		Actor-Partner		Partner-Actor	
	<i>b</i>	95% BC CI	<i>b</i>	95% BC CI	<i>b</i>	95% BC CI
Neuroticism	-.04*	[-.08, -.01]	.01	[-.01, .03]	.01	[-.01, .04]
Agreeableness	.00	[-.01, .02]	.00	[-.01, .01]	.00	[-.002, .002]
Conscientiousness	.01	[-.01, .02]	.01	[-.01, .02]	.00	[-.004, .01]
Extraversion	.00	[-.02, .02]	.00	[-.01, .02]	.00	[-.003, .002]
Openness	.00	[-.02, .02]	.00	[-.02, .02]	.00	[-.001, .001]

Notes. * $p < .05$

Running Head: BIG FIVE TRAITS, SELF-ESTEEM AND RELATIONSHIP SATISFACTION

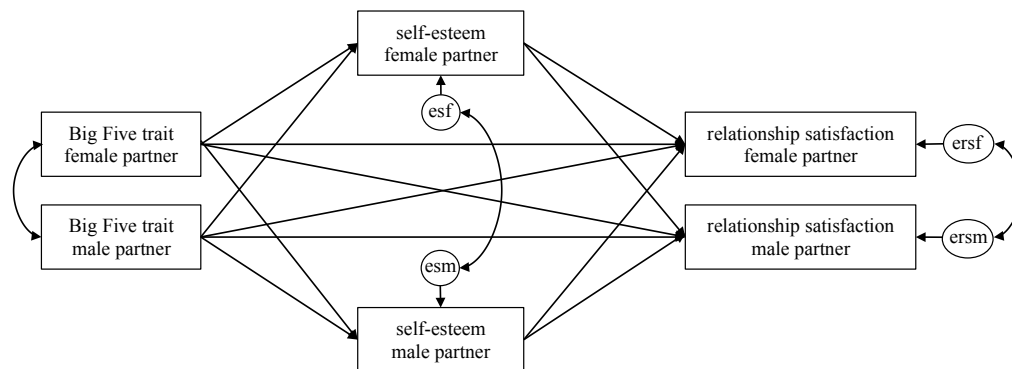


Figure 1. Actor-Partner Interdependence Mediation Model with Big Five traits prediction relationship satisfaction and self-esteem as mediator.

APPENDIX E: Article 5

Weidmann, R., Ledermann, T., Gomez, V., Robins, R. W., & Grob, A. Big Five traits and self-esteem: Concurrent and longitudinal associations within and between family members from the Netherlands, Switzerland, and the U.S. *Manuscript submitted for publication to Journal of Personality and Social Psychology.*

Draft October 24, 2016

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES

1

Running Head: PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES

Big Five traits and self-esteem: Concurrent and longitudinal associations within and between family members from the Netherlands, Switzerland, and the U.S.

Rebekka Weidmann

University of Basel

Thomas Ledermann

Utah State University

Veronica Gomez

University of Zürich

Richard W. Robins

University of California at Davis

Alexander Grob

University of Basel

Author Note

We thank Laura Wiles for proofreading the manuscript.

Rebekka Weidmann, Department of Psychology, University of Basel, Switzerland

Correspondence concerning this article should be addressed to Rebekka Weidmann,

Department of Psychology, University of Basel, Missionsstrasse 62, 4055 Basel,

Switzerland.

E-mail: rebekka.weidmann@unibas.ch

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES

2

Abstract

The Big Five traits and self-esteem are typically studied in isolation and consequently little is known about their mutual influence on each other and whether the family context affects these relations. The present study used data from four longitudinal studies (total $N = 1,117$ families) to address two fundamental questions about the nature of the association between the Big Five and self-esteem in families. First, to what extent are they reciprocally related over time? Second, how does the personality/self-esteem of one family member (partner, parent, and offspring) influence the personality/self-esteem of another family member? As to the first question, results based on a triadic Actor–Partner Interdependence Model revealed reciprocal longitudinal associations between Big Five traits and self-esteem. Specifically, extraversion, conscientiousness, low neuroticism, and openness predicted increases in self-esteem whereas self-esteem predicted decreases in neuroticism and increases in the remaining Big Five traits. With regard to familial influences, results indicated that: (a) individuals with extraverted relationship partners tend to have higher self-esteem; (b) individuals with agreeable relationship partners tend to increase over time in agreeableness; (c) neurotic women tend to have partners with lower self-esteem; (d) women with extraverted relationship partners tend to decline in extraversion; (e) children with conscientious parents tend to increase in conscientiousness; and (f) agreeable children tend to have mothers with higher self-esteem and fathers who increase in self-esteem. Taken together, these findings suggest that personality and self-esteem co-develop over time within close social systems.

Word count: 239

Keywords: Big Five traits, self-esteem, triadic APIM, family, codevelopment in personality

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES

3

Big Five traits and self-esteem: Concurrent and longitudinal associations between family members from the Netherlands, Switzerland, and the U.S.

The Big Five traits and self-esteem are among the most widely studied constructs in psychology (John & Srivastava, 1999; Robins, Tracy, Trzesniewski, Potter, & Gosling, 2001; Watson, Suls, & Haig, 2002), with implications for important life outcomes, including health, work success, and relationship well-being (Orth, Robins, & Widaman, 2012; Ozer & Benet-Martinez, 2006; B. W. Roberts, Kuncel, Shiner, Caspi, & Goldberg, 2007). They have often been studied independently of each other, and consequently little is known about whether the Big Five traits influence self-esteem development, self-esteem predicts personality trait development, or both (Robins, Tracy, et al., 2001). Theoretical models of personality postulate that Big Five traits and self-esteem are conceptually linked, but do not necessarily assume they are reciprocally associated over the course of development (McAdams & Pals, 2006; McCrae & Costa, 1999). A related question is how these associations play out in the family context, arguably the most important developmental context. We know relatively little about the extent to which family members influence each other on personality and self-esteem. For example, are youth who grow up with conscientious parents more likely to develop high self-esteem or become more conscientious themselves?

The present study used data from four longitudinal studies (total $N = 1,117$ families) to address two fundamental questions about the nature of the association between the Big Five and self-esteem. First, to what extent are they reciprocally related over time? That is, do the Big Five traits predict change in self-esteem and, conversely, does self-esteem predict change in the Big Five? Second, how does the personality/self-esteem of one family member (partner, parent, and offspring) influence the personality/self-esteem of another family member? Thus, the first goal of our study is to examine bidirectional prospective associations between the Big Five traits and self-esteem. A related question is whether personality traits and self-esteem share common developmental origins (Robins, Tracy, et al., 2001). Therefore,

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES

4

when studying personality and self-esteem development it is imperative to examine the social context as a potential source of shared developmental influences. One of the most important developmental contexts is the family. Considering the perspective of “codevelopment in personality” (Neyer & Asendorpf, 2001, p. 1190), some evidence suggests that relationships with significant others impact one’s own personality development (Daniels, 1986; Harris et al., 2015; Neyer & Asendorpf, 2001; Neyer & Lehnart, 2007; Reitz, Zimmermann, Hutteman, Specht, & Neyer, 2014; Robins, Caspi, & Moffitt, 2002). Hence, the second goal of this study is to examine cross-sectional and longitudinal interpersonal associations of personality traits and self-esteem within parental couples and between parents and their offspring with four family samples from the Netherlands, Switzerland, and the United States. By so doing, the present article considers the interpersonal perspective by investigating the relevance of family members in shaping Big Five traits and self-esteem between parental couples and parents and their offspring.

Big Five Traits and Self-Esteem

Personality traits and self-esteem have a long history of research. Personality traits have been studied as crucial predictors for a myriad of different life outcomes, including relationship and life satisfaction, psychological and physical health, mortality, and work success (Caspi, 2000; Dyrenforth, Kashy, Donnellan, & Lucas, 2010; Hampson et al., 2016; Hurtz & Donovan, 2000; B. W. Roberts et al., 2007). The Big Five taxonomy is a widely acknowledged model to study human personality (John & Srivastava, 1999) and refers to the traits of extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience.

Similarly, self-esteem is one of the most extensively studied constructs in psychology (Donnellan, Trzesniewski, & Robins, 2011) and has also been associated with important life outcomes. Individuals with higher self-esteem enjoy happier relationships, more satisfaction in their occupation, report lower depression, better psychological and physical health, show

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES

5

less criminal behavior, more positive affect, and better scholastic and employment prospects (Boden, Fergusson, & Horwood, 2008; Orth et al., 2012; Trzesniewski et al., 2006).

Although the vast majority of research on personality traits and self-esteem has been conducted in isolation from each other (Robins, Tracy, et al., 2001), recent research incorporates both to study how they relate to each other and how they impact various outcomes. Cross-sectional studies show that Big Five traits and self-esteem are connected. More specifically, research demonstrates that neuroticism is negatively associated with self-esteem whereas agreeableness, extraversion, and conscientiousness, and openness are often positively linked to self-esteem (Amirazodi & Amirazodi, 2011; Campbell, Rudich, & Sedikides, 2002; Erdle, Gosling, & Potter, 2009; Robins, Hendin, & Trzesniewski, 2001; Robins, Tracy, et al., 2001; Watson et al., 2002; Weidmann, Ledermann, & Grob, 2016).

With regard to the longitudinal reciprocity between Big Five traits and self-esteem, two theoretical frameworks have hypothesized differing assumptions. The five-factor theory of personality hypothesizes that personality traits affect self-esteem in an unidirectional way (McCrae & Costa, 1999). Accordingly, Big Five traits are defined as basic tendencies that are expressed through characteristic adaptations that include an individual's self-concept and self-esteem. Characteristic adaptations are hence manifestations of the more stable personality traits and do not directly impact them in reverse (McCrae & Costa, 1999). In a similar vein, from a developmental perspective, it has been argued that because personality traits and their temperamental precursor develop earlier than the so-called surface characteristics such as self-esteem, the former should rather influence self-esteem than the other way around (Asendorpf & van Aken, 2003; Kandler, Zimmermann, & McAdams, 2014).

In contrast, the assumption of reciprocity between personality traits and self-esteem originates from the New Big Five personality model (McAdams & Pals, 2006) within which dispositional tendencies, such as Big Five traits, and characteristic adaptations, including self-esteem, interact in a reciprocal way. According to this theoretical postulate, characteristic

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES

6

adaptations are not simply derivatives of traits but reciprocally interact with stable dispositions (McAdams, 1995). Further, self-esteem is not developed due to broad dispositions, but rather, is impacted by the development of children to strive for goal achievement, which in turn, fuels self-esteem (McAdams, 2015).

We are aware of two large longitudinal studies that examined the association between Big Five traits and self-esteem development. These studies suggest that individuals low in neuroticism and high in agreeableness, conscientiousness, extraversion, and openness show an increase in self-esteem across the transition to young adulthood (Wagner, Lüdtke, Jonkmann, & Trautwein, 2013) and across the life span (Erol & Orth, 2011). However, the degree to which Big Five traits and self-esteem influence each other over time has not been investigated. Only recent evidence exists, suggesting that higher self-esteem is associated with lower neuroticism across two years (Weidmann et al., 2016). Therefore, the present study will investigate the directionality of the longitudinal relationship between personality traits and self-esteem.

In sum, we hypothesize the cross-sectional associations between Big Five traits and self-esteem will also hold longitudinally but to a lesser degree. Specifically, we investigate the competing views on the reciprocal influence of Big Five traits and self-esteem from a longitudinal perspective (McAdams & Pals, 2006; McCrae & Costa, 1999).

Codevelopment in Personality and Self-Esteem within the Family

Within the framework of interdependence theory, it has been repeatedly stated that many dispositions emerge within the social context and that interpersonal experiences are internally accumulated to translate into durable, interpersonal orientations (Kelley, 1983; Rusbult & Van Lange, 2003). In the same vein, Neyer and Asendorpf (2001) coined the term *codevelopment in personality*, suggesting that individuals' personality does not develop in social isolation. Rather, significant social relationships affect the individual in a constant dynamic interplay (Magnusson & Allen, 1983). These assumptions are based on the

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES

7

interactionist perspective of Magnusson (1990), who stated that, “the life course of each individual takes place in a dynamic, reciprocal interaction process in which both the person and the environment change across time” (p. 217). There are several studies supporting this notion that personality trait and self-esteem development is shaped by close relationships (Lehnart & Neyer, 2006; Lehnart, Neyer, & Eccles, 2010; Neyer & Lehnart, 2007; Parker, Lüdtkke, Trautwein, & Roberts, 2012; Robins et al., 2002) or by life events that include important relational transitions, such as leaving the parental home, entering the first partnership, moving in with the partner, marriage, and divorce (Luciano & Orth, 2016; Neyer & Asendorpf, 2001; Neyer & Lehnart, 2007; Specht, Egloff, & Schmukle, 2011).

However, we know of only little evidence about how an individual’s personality development is affected by the personality of close partners, especially family members. It is thus crucial to broaden the focus of personality research to investigate not only relationships and life events (so-called person-relationship or person-environment transactions), but also the direct impact of other individuals’ personality from an ongoing close relationship. Evidence on such person-person transactions would broaden the perspective of environmental influences on personality development and the research on the determinants of personality maturation.

The family context is of great importance and reflects a crucial socializing environment, especially during adolescence and young adulthood (Wrzus & Neyer, in press). The recent TESSERA framework posits that repeated triggering situations can have a long-term impact on personality change and stability (Wrzus & Roberts, 2016) because they elicit certain states within the individuals that are reinforced or punished. These states can be repeated over time leading to personality change or stability. A plethora of triggering situations can be found within the daily interactions of parental couples or parents and their children that might foster personality development over time. These can include day-to-day interactions, conflict scenes, parenting and teaching situations, and shared hobbies. Because

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES

8

familial bonds are affected by life events, such as the birth of a child, the death of a loved one, divorce, and retirement, familial bonds can have a long-lasting effect on an individual. In addition, familial relations last a lifetime and therefore provide the opportunity for a myriad of repeating sequences to stabilize or change an individual's personality. In the following, we will focus on the parental couple and parent-offspring relationship and on how these two relationships might impact the individual's Big Five traits and self-esteem.

Romantic Couples

Romantic relationships are essential to many individuals (Holden, Zeigler-Hill, Pham, & Shackelford, 2014) and have often been studied in terms of how both partners' personality is related to relevant relationship outcomes (Cooper & Sheldon, 2002; Karney & Bradbury, 1995; Weidmann, Ledermann, & Grob, in press) and, less often, how relationship variables impact personality and self-esteem over time (Asendorpf & Wilpers, 1998; Mund & Neyer, 2014; Neyer & Asendorpf, 2001). The goal of the current study is to expand current research by focusing on how one partner's personality is related and predictive of the other partner's personality. More specifically, our aim is to examine whether romantic partners' personality traits and self-esteem are linked concurrently and influence each other over time.

The literature on couple convergence for personality traits and self-esteem shows mixed results with more selection rather than convergence effects (Caspi & Herbener, 1990; Caspi, Herbener, & Ozer, 1992; Gonzaga, Campos, & Bradbury, 2007; Humbad, Donnellan, Iacono, McGue, & Burt, 2010; Price & Vandenberg, 1980; Rammstedt & Schupp, 2008; Schafer & Keith, 1992). However, whether an individual increases or decreases on a certain trait due to the partner's personality remains unclear. More specifically, evidence is rare on within-trait codevelopment in close relationships. One study with same-sex college friends examined extraversion and whether complementary friendship pairs accommodate their personality in comparison to matched friends that share the same low or high level of extraversion (Nelson, Thorne, & Shapiro, 2011). Results reveal that in most domains, friends

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES

9

take on complementary roles (such as talker and listener). However, some accommodation was also revealed (Nelson et al., 2011). In order to translate these findings into the realms of romantic relationships, we assume that due to the multiple tasks and roles that parental couples share, personality development within the same trait across partners could lead to processes of accommodation and complementarity. This could be most pronounced within the traits of extraversion and neuroticism. These traits share a strong affective component, which impacts the daily social interactions between couple members (e.g., Finn, Mitte, & Neyer, 2013; Vater & Schröder-Abé, 2015). Partners might thus try to uphold an affective balance between couple members to enable adaptive functioning.

Accommodation processes and phenotypic convergence (Caspi et al., 1992) within romantic relationships have been addressed in the context of two theories. First, within the self-expansion theory individuals strive to expand the self based on their motivation for self-improvement (E. N. Aron & Aron, 1996). As relationships progress, the partner is included in the self-concept, facilitating self-expansion in the self where the partner's characteristics and viewpoints are incorporated into the self (A. Aron, Lewandowski Jr, Mashek, & Aron, 2013). Second, the Michelangelo phenomenon explains the process partners assisting each other to attain their ideal selves through perceptual and behavioral affirmation (Rusbult, Finkel, & Kumashiro, 2009). More specifically, if one partner perceives and treats the other partner as if he or she has already achieved the ideal self, the other partner will more likely move toward the ideal self. In addition, if one partner possesses traits and characteristics that are in accordance with the other partner's ideal self, the process of reaching the ideal is facilitated (Rusbult et al., 2009). Therefore, if partners hold ideal selves that are similar to the partner's actual self, accommodation will be more likely.

These theories assume that certain traits are desirable and will either be incorporated from the partner, or attained through the partner's affirmation. These ideals could involve the Big Five traits (including emotional stability) and high self-esteem. Because the Big Five

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES

10

traits and self-esteem represent socially desirable traits (Baumeister, Campbell, Krueger, & Vohs, 2003; John & Robins, 1993), we hypothesize that couple members might impact each other's personality and self-esteem in the same direction over time. For instance, a conscientious partner might impact the other partner to be more conscientious over time and vice versa, because conscientiousness might represent an ideal that partners strive for.

In addition, because couples share an environment that simultaneously impacts both partners, they might change their traits in the same direction over time resulting in accommodation. Butner, Diamond, and Hicks (2007) found for instance that couples coordinate their daily emotional experiences. Thus, partners might influence each other within the same personality trait or within self-esteem. More specifically, if one partner scores high in a certain trait, it is likely that the other partner will also increase in that trait.

As far as complementarity processes within romantic relationships are concerned, interpersonal theory proposes that interactions run smoother if partners show complementary behavior and traits (Carson, 1969). Further, the complementary needs theory states that romantic partners select complementary partners in order to gratify their needs (Winch, Ktsanes, & Ktsanes, 1954). This is, for instance, the case if an extraverted and talkative partner prefers a partner who is rather less talkative and a good listener. Within a long-term romantic relationship, such need gratification might become more durable with time and enable partners to further stabilize their assigned complementary roles and traits.

In addition to within-trait codevelopment in couples, the investigation of codevelopment across traits seems an obvious endeavor. For example, one partner's conscientiousness and the resulting achievements could increase the other partner's self-esteem because he or she identifies with the successful partner (E. N. Aron & Aron, 1996). To the best of our knowledge, no evidence exists that specifically considered within-trait and between-trait codevelopment within couples. Our examinations are therefore exploratory.

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES

11

Parents and Offspring

Beyond the realm of romantic relationships, other relationships have rarely been investigated when examining personality codevelopment (Neyer & Asendorpf, 2001). In the course of life, romantic couples often raise a family. Parent-offspring relationships also reflect significant close relationships, especially because familial and biological ties are characterized by emotional intensity and durability (Birditt, Miller, Fingerman, & Lefkowitz, 2009).

Adolescence and young adulthood represent a crucial period for personality development (B. W. Roberts, Walton, & Viechtbauer, 2006). Nevertheless, less is known about how significant others, such as parents, shape this development towards maturity (Schofield et al., 2012). We are specifically interested whether parental Big Five traits and self-esteem influence their offspring's Big Five traits and self-esteem and vice versa. Why should this be the case? In the following, we will focus on the family environment that contributes to personality and self-esteem and their development.¹

Personality traits are triggered and impacted by proximal external stimuli (Bouchard & Loehlin, 2001). This perspective is in line with an environmentalist view often proposed in developmental psychology, focusing on psychological contributions for shaping development (Bronfenbrenner, 1994). Thus, drawing from developmental psychology, personality development might occur through several pathways within the social context (Hoffman, 1991). Within the family and more specifically between parents and their offspring, these pathways can be subsumed in (a) the parent-offspring relationship quality, (b) parenting styles, and (c) being a role model.

As a first pathway, the parent-child relationship represents a possible explanation of why parental and offspring personality might impact each other. During adolescence, both the parents' and the offspring's personality affect the quality of their relationship (Denissen, van Aken, & Dubas, 2009). Regarding self-esteem, concurrent associations have been found between closeness and attachment to parents and offspring self-esteem in adolescents (Harris

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES

12

et al., 2015; Laible, Carlo, & Roesch, 2004). A study conducted with youths across 20 years showed that stronger affective ties to parents predicted long-term self-esteem in offspring. However, when controlling for self-esteem stability, the result was not significant (R. E. L. Roberts & Bengtson, 1996).

As a second pathway, parenting styles may act as mediator and explain the association between parental and offspring personality. Meta-analytic evidence about the link between parents' personality traits and their parenting styles reveals extraversion, agreeableness, conscientiousness, and openness to be positively related to parental warmth, behavioral control, and maternal adaptive parenting, and neuroticism to be negatively related to these parenting outcomes (McCabe, 2014; Prinzie, Stams, Dekovic, Reijntjes, & Belsky, 2009). Studies examining the association between parenting and offspring personality demonstrate that parenting styles shape the child's personality (Taylor, Eisenberg, Spinrad, & Widaman, 2013; Van den Akker, Dekovic, Asscher, & Prinzie, 2014). More specifically, overreactive maternal parenting behavior negatively predicted change in a child's conscientiousness, and maternal warmth negatively predicted change in emotional stability. However, offspring have also been shown to shape parenting styles (Kiff, Lengua, & Zalewski, 2011; Van den Akker et al., 2014). Finally, a study examining two-parent families with adolescent offspring found mediating effects for parental personality traits (agreeableness, emotional stability, and conscientiousness) to predict their adolescent child's traits two years later, mediated by their positive parenting style (Schofield et al., 2012).

The third pathway assumes that behaviors can be acquired through parental role modeling. As shown in the prominent Bobo doll study (Bandura, Ross, & Ross, 1963), children imitate or mimic observed behavior and learn from role models. In accordance with social learning theory, role modeling produces learning effects that generalize across domains (Bandura, 1971). Parents can be seen as role models that demonstrate certain traits their children can imitate and incorporate into their own personality.

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES

13

With regard to codevelopment within the same personality traits and within self-esteem in parents and offspring, these three pathways—the parent–offspring relationship, parenting styles, and role modeling—might describe how parental traits impact offspring personality development. For instance, it has been suggested that agreeableness can be socialized (Graziano & Eisenberg, 1997) and thus might be fostered through role modeling. Likewise, self-esteem can be transacted from parents to offspring through role modeling (Elfhag, Tynelius, & Rasmussen, 2010). Parental conscientiousness is linked to adaptive parenting and a positive parent–child relationship, which is further associated with the offspring’s self-regulation (Eisenberg, Duckworth, Spinrad, & Valiente, 2014) – a construct closely tied to conscientiousness (McCrae & Löckenhoff, 2010).

Regarding codevelopment across different personality traits, evidence demonstrates that less open parents show more authoritarian parenting styles (Denissen et al., 2009; McCrae, 1996), which might lead to lower self-esteem in offspring (Milevsky, Schlechter, Netter, & Keehn, 2007). In a similar vein, conscientious parents could role model behavior that fuels success in the child, which in turn contributes to heightened self-esteem in the offspring. More extraverted parents may also role model social skills that enhance the child’s social acceptance, which results in higher self-esteem in offspring (Leary & Baumeister, 2000). Evidence on longitudinal codevelopment within and across personality trait and self-esteem is rare. We know of only one study that analyzed the effect of mother and father’s personality traits (agreeableness, emotional stability, and conscientiousness) on their offspring’s personality traits in the 10th and 12th grade and found both parents’ personality to predict their offspring’s personality traits two and four years later (Schofield et al., 2012). However, whether the child’s personality also predicts parental personality has not yet been tested.

Based on a transactional perspective (Magnusson, 1988), we do not exclude the assumption that the child can also affect the parents’ personality and self-esteem

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES

14

development. As mentioned above, offspring contribute to parenting style and the parent-offspring relationship (Denissen et al., 2009; Van den Akker et al., 2014). Because most developmental and personality research has focused on the impact of socialization and parenting, less is known about the impact of children's personality on their parents (Shiner & Caspi, 2003).

The Present Study

The present study aims to answer two main questions. First, to what extent are Big Five traits and self-esteem reciprocally related over time? Second, how does the personality/self-esteem of one family member (partner, parent or offspring) influence the personality/self-esteem of another family member? Thus, the present study examines the concurrent and longitudinal associations of Big Five traits and self-esteem within and between family members. More specifically, we examine the potential bidirectional effect of Big Five traits and self-esteem in family members and, in addition, the codevelopment in personality and self-esteem within parental couple partners as well as between parents and their offspring. This study extends previous research in three important ways:

1. We investigate the concurrent and longitudinal effects between Big Five traits and self-esteem within family members and therefore test the two postulated directions found in the five-factor theory of McCrae and Costa (1999) and the New Big Five by McAdams and Pals (2006).
2. We study couple relationships and parent-offspring relationships as crucial social relationships for codevelopment in personality.
3. We examine these questions by analyzing data from four family studies from various nations and different age range.

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES

15

Method

We used data from four studies (in order from youngest mean age of offspring to oldest): (a) California Families Project from California, USA, (b) Family and Personality Project from the Netherlands, (c) Co-Development in Personality Study from Switzerland, and (d) Longitudinal Study of Generations from California, USA. Table 1 gives an overview on the four samples. In the following, we present the samples, measures, and analytic strategies.

The California Families Project (CFP)

The CFP is an ongoing longitudinal study in which families of Mexican origin, as indicated by their heritage and self-identification, were recruited from a large metropolitan area in northern California, USA. Eligible families had a typically functioning child (first, second, or third generation of Mexican origin) in the fifth grade of a public or Catholic school, who had been living with his or her biological mother. Both, two-parent families ($N = 548$) and single-parent ($N = 124$) families were recruited. The father in two-parent families had to be the child's biological father. Rosters of fifth grade children from two school districts were used to randomly select the families who were invited to participate. Of the eligible families, 72.5% agreed to participate. Data were collected during the 2006–2007 and 2007–2008 school years. All interviewers were fluent in both Spanish and English, and were either Latino/a or had extensive experience in the Latino community. They visited the families on two separate occasions within a 1-week period to avoid respondent fatigue. Interviews were conducted in Spanish or English based on the preference of the participant (for further information, see Castro-Schilo et al., 2013; Cruz et al., 2014).

For the current research, we used data of 401 families with both parents living with their offspring. Offspring mean age was 14.2 years ($SD = 0.51$, range from 13 to 16 years) and sex ratio was 50.4 % female. Mothers were on average 40.8 years old ($SD = 5.7$, range from 31 to 57 years). And fathers reported a mean age of 43.3 years ($SD = 6.2$, range from 32 to 66 years).

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES

16

Measures. The 44-item English Big Five Inventory (John, Donahue, & Kentle, 1991) was designed to assess the five dimensions of personality at the broadest level. Benet-Martinez and John Benet-Martinez and John (1998) translated the BFI into the Spanish language and tested it with college students in Spain and the United States, a college-educated sample of bilingual Hispanics and finally, with a working-class bilingual Hispanic sample (50% Mexican, 3% Peruvian, 2% Chilean, 2% Panamanian, 2% Argentinian, 1% Cuban, 1% Puerto Rican, and less than 1% each Venezuelan, Honduran, Ecuadorean and Guatemalan. For the CFP, the items of the Benet-Martinez version and the response categories were modified from the original 5-point Likert-type scale to a 4-point Likert-type scale ranging from *strongly agree* to *strongly disagree*. Internal reliabilities ranged from .65 to .80 across family members.

Self-esteem was measured with the 10-item Rosenberg Self-Esteem Scale (Rosenberg, 1965) with a 4-point Likert scale ranging from 1 (*totally disagree*) to 4 (*totally agree*). Example items are “I feel that I have a number of good qualities” and “I feel that I am a person of worth, at least on an equal basis with others”. Alpha reliabilities were good ranging between .78 to .85 across family members.

Family and Personality Project (FPP)

The data of the Family and Personality Project (Gezin en Persoonlijkheid) were collected as part of a joint research project of the Faculties of Social Sciences of the Universities of Nijmegen and Utrecht, the Netherlands. The project was a temporary joint venture of four departments of the Faculties of Social Sciences of the University of Utrecht and the Radboud University of Nijmegen. Its principal goal was to study the transactional development of relationships and personality in families with adolescent children. To this end a longitudinal data collection was designed and executed. The project followed 288 families with adolescent children during a period of at least two years. Preparations for the project

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES

17

started in 1997. Three main measurement waves were organized, starting in 1998, and with an intended interval of 1 year. In these three waves the main theoretical constructs of the project were repeatedly measured in the participating families (for further information, see Haselager, Knippenberg, & van Aken, 2014).

At wave 3, data of self-reported Big Five traits and self-esteem were available. We used data of 285 families with both parents and their oldest offspring (50% female). Fathers were on average 46.0 years old ($SD = 3.7$, range from 36.1 to 58.1 years). Mothers reported a mean age of 43.7 ($SD = 3.3$, range from 36.1 to 53.2 years). Offspring were in late adolescence reporting an average age of 16.6 years ($SD = 0.8$, range from 13.5 to 18.0 years). Because we only had Big Five traits and self-esteem measured at one time point, this data set is used for cross-sectional analyses only.

Measures. Personality was measured with a 30-item questionnaire based on the five-factor model. It is an adaptation and translation, developed by the KUN Institute of Family Studies (Gerris, Houtmans, Kwaaitaal-Roosen, & Schipper, 1998), of Goldberg's Goldberg (1992) work on unipolar markers for the Big-Five factor structure. The model contains the following five dimensions: Extraversion, agreeableness, conscientiousness, neuroticism (inverted emotional stability), and openness to experience (richness of ideas). Participants were asked to rate themselves on a 7-point Likert-scale from 1 (*strongly disagree*) to 7 (*strongly agree*). The questionnaire showed satisfactory to excellent internal reliabilities ranging from .73 to .90 across family members. Self-esteem was measured with the Dutch-version of the Rosenberg Self-Esteem Scale. On a 10-point Likert scale, participants rated the degree to which the 10 statements applied to them. Cronbach's alpha was good ranging from .87 - .89.

Co-Development in Personality (CoDiP)

The CoDiP Project is a longitudinal three-generation project of the Universities of Basel, Zurich, and Lausanne, Switzerland. During three measurement points in 2010, 2012

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES

18

and 2014, young adult offspring, their romantic partners, siblings, parents, and grandparents received questionnaires via mail on personality, goals, and other variables. Of the 1050 individuals participating in the first measurement wave in 2010, 722 completed the questionnaires at the second measurement point in 2012 (31.2% attrition).

For the present study, we focus on the first two measurement points and on the parental and parent–offspring dyads. The sample for the analyses consists of 121 two-parent families and their offspring, 53 families with only mother and offspring, 20 families with only father and offspring, and, finally, 7 parental dyads (i.e., no data of children available). The distribution of sons and daughters was unequal, in favor of female children. Thus, if families only provided data of one son or two sons, we chose the son or one son at random, respectively; if they only had one daughter participating or two daughters, we chose the daughter or one daughter at random, respectively. Thereby, we reached a ratio of 58.2% female offspring. At Time 1, fathers ($N = 147$) were on average 53.2 years old ($SD = 6.1$, range from 38 to 87 years). Mothers ($N = 201$) reported a mean age of 50.4 years ($SD = 4.7$, range from 39 to 68 years). Offspring ($N = 193$) age was on average 20 years ($SD = 3.5$, range from 12 to 42 years).

Measures. The German version of the Big Five Inventory (John & Srivastava, 1999; Rammstedt & John, 2005) was used to assess the Big Five traits agreeableness, conscientiousness, extraversion, neuroticism and openness to experience. Participants rated themselves on 45 items on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The internal reliabilities of the Big Five traits ranged from .70 to .89 across family members. Participants' self-esteem was measured with the German version of the Rosenberg Self-Esteem Scale (Rosenberg, 1965; von Collani & Herzberg, 2003). This 10-item questionnaire assesses a global evaluation of the self on a four-point scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*). Cronbach's alpha was good ($\alpha = .83 - .89$).

Longitudinal Study of Generations (LSOG)

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES

19

The Longitudinal Study of Generations (LSOG), initiated in 1971, began as a survey of intergenerational relations among 300 three-generation California families with grandparents (then in their sixties), middle-aged parents (then in their early forties), and grandchildren (then aged 15 to 26). The study broadened in 1991 and now includes a fourth generation, the great-grandchildren of these same families (for further information, see Bengtson, 2009).

For the present study, we used data of 230 families of which both parents were biological parents. Similar to the procedure used for the CoDiP sample, we used data of one son or one son at random, if data of two or more male offspring were available. If not, we used data of the daughter or one daughter at random. In doing so, we attained a sex ratio of 54.8% female offspring. We had personality reports for 102 families with both parents and offspring, 88 families with only mother and offspring, 18 families with only father and offspring, and 22 families with only biological parents, for which information was available that they had children. Fathers ($N = 142$) reported an average age of 61.7 years ($SD = 4.6$, range from 52 to 76 years). Mothers' ($N = 212$) reported a mean age of 59.3 years ($SD = 4.6$, range from 47 to 76 years). And offspring ($N = 208$) reported to be an average of 35.5 years old ($SD = 3.1$, range from 21 to 44 years).

Measures. Personality traits were measured with the 18-item Eysenck Extraversion/Neuroticism Scale adapted from H. J. Eysenck and Eysenck (1963) and S. B. G. Eysenck, Eysenck, and Barrett (1985). At wave 3, neuroticism and extraversion were rated on 9 items with yes or no. Example item for neuroticism is "Are you a worrier?" and for extraversion: "Are you a talkative person?" At wave 5, the same items as statements rather than questions were rated on a 4-point Likert scale ranging from 1 (*totally agree*) to 4 (*totally disagree*). The internal reliabilities for extraversion and neuroticism ranged from .75 to .87. Further, to measure self-esteem the Rosenberg Self-Esteem Scale (Rosenberg, 1965) was used and rated

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES

20

on a 4-point Likert scale ranging from 1 (*strongly agree*) to 4 (*strongly disagree*). Cronbach's alpha was good ranging from .82 to .87.

Insert table 1 about here

Analytic Strategies

Our analytic strategy included first to test concurrent intrapersonal and interpersonal associations between parents' and offspring's Big Five traits and self-esteem using a triadic Actor-Partner Interdependence Model (Ledermann, Rudaz, & Grob, in press) and Structural Equation Modeling. We computed five models, one for each of the Big Five traits. Figure 1 depicts the concurrent triadic APIM. The model computes intrapersonal or actor effects within each family member as well as interpersonal or partner effects between family members. Second, we analyzed longitudinal triadic APIMs to test for the longitudinal actor and partner effects of (a) Big Five traits on self-esteem (Figure 2) and (b) self-esteem on Big Five traits, controlling for their respective stabilities.

As in the application of dyadic APIM, we estimated a series of submodels by imposing equality constraints on actor and partner effects. First, we tested whether actor and partner effects between parents can be set equal, resulting in two degrees of freedom ($df = 2$). Next, we tested whether partner effects from mother to offspring and father to offspring can be set equal ($df = 1$) and whether partner effects of offspring to mother and father can be constrained to be equal ($df = 1$). When all these constraints hold, we imposed these constraints in a final model resulting in 4 degrees of freedom (df). We did not test whether paths of parents and of offspring could be set equal because evidence suggests that these influences are not comparable on a conceptual level (e.g., Van den Akker et al., 2014). For the longitudinal analyses, we followed the same logic, resulting in a possible final model with 8 df that are attained by imposing constraints on the associations between the predictor variables and on the stability coefficients. We considered a comparative fit index (CFI) and a Tucker-Lewis

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES

21

index (TLI) greater than .95 and root-mean-square error of approximation (RMSEA) below .06 to be a good model fit (Hu & Bentler, 1999). Further, we evaluated nested model comparison with the chi-square test. However, if the chi-square test was significant, we inspected whether significance was impacted by sample size rather than the worsening of the model fit by employing the test of small difference in fit test (MacCallum, Browne, & Cai, 2006). In all models we controlled for the offspring's gender. The model fits can be found in the supplementary online material. For reasons of simplicity, we will refer to the first measurement time point of each study as Time 1 (T1) and the second measurement time point of each study as Time 2 (T2). Finally, because multiple models will be tested, we will only interpret effects that have been replicated across two or more studies or single effects that are below $p < .01$ with a regression coefficient $\geq .10$, an approach that has often been used within personality research (Mund & Neyer, 2014; Parker et al., 2012). For the triadic APIM analyses, we z -standardized the variables in all four data sets prior to the analyses to increase the comparability of the results between the studies. In doing so, the unstandardized coefficients can be interpreted as standardized estimates.

Insert figure 1 about here

Results

Concurrent Associations between Big Five Traits and Self-Esteem

The first goal was to examine the actor and partner effects between parents' and offspring's Big Five traits and self-esteem. The results of the cross-sectional APIM analyses are shown in Table 3 and indicate that extraversion, agreeableness, conscientiousness, and openness to experience are positively associated with self-esteem, whereas neuroticism is negatively linked to self-esteem. These patterns were found for both parents in all four studies. For offspring, these links were comparable in sizes with the exception of

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES

22

conscientiousness and self-esteem (significant in the CFP, but not in FPP and CoDiP), as well as openness and self-esteem (significant in CFP and FPP, but not in CoDiP).

Turning to partner effects within parental couples, the results demonstrate that extraversion of one partner was associated with the other partner's self-esteem (CFP: $b = .11$, 95% CI [.05, .18]; FPP: $b = .09$, 95% CI [.01, .17]; CoDiP: $b = .14$, 95% CI [.03, .25]). For neuroticism, the results suggest a negative association between the mother's neuroticism and the father's self-esteem (CFP: $b = -.07$, 95% CI [-.14, -.01]; LSoG: $b = -.18$, 95% CI [-.35, -.004]).

Partner effects between parents and their offspring did not suggest that personality and self-esteem were associated across generations with one exception. In the CFP and the FPP data, offspring agreeableness was positively linked to the mother's self-esteem ($b = .12$, 95% CI [.04, .20] and $b = .08$, 95% CI [.002, .15], respectively). This indicates that mother's self-esteem depends not only on her own agreeableness but also the agreeableness of her child.

Insert table 3 about here

Longitudinal Associations: Big Five Traits Predicting Self-Esteem

The first longitudinal model included Big Five traits as predictors and self-esteem of the three family members as outcome variable. In addition, we added self-esteem at T1 and controlled for its stability (Figure 2). Table 4 shows the actor effects between Big Five traits at T1 and self-esteem at T2. Parents' results suggest that lower neuroticism, higher conscientiousness, extraversion, and openness predict their self-esteem two years later. In offspring, higher extraversion and lower neuroticism predict increases in self-esteem over time.

Insert figure 2 about here

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES

23

Partner effects of family member's self-esteem and another member's self-esteem yielded no significant results. Further, partner effects between self-esteem and Big Five traits revealed one significant effect. In the CFP data, agreeable offspring tend to have fathers that increase in self-esteem two years later ($b = .16$, 95% CI [.06, .26]).

Insert table 4 about here

Longitudinal Associations: Self-Esteem Predicting Big Five Traits

We computed the same model as depicted in Figure 2, but with family members' self-esteem as predictor and Big Five traits as outcome controlling for their stabilities. Results on longitudinal actor effects between self-esteem and Big Five traits demonstrate that self-esteem predicts increases or decreases in Big Five traits (Table 5). More specifically, in parents, all three studies suggest that higher self-esteem predicted decreases in neuroticism. Results of the CFP and LSoG sample demonstrate additional effects for extraversion, suggesting that higher self-esteem was related to increased extraversion. Further, as shown in the CFP sample, self-esteem also predicted increases in conscientiousness, agreeableness, and openness in parents. In offspring, self-esteem predicted lower neuroticism, increased extraversion, and increased openness.

Longitudinal partner effects within Big Five traits of family members were found in three cases. First, parents impacted each other's agreeableness positively in the CFP study, meaning that if one partner reported higher agreeableness the other partner tended to increase in agreeableness over time ($b = .12$, 95% CI [.04, .19]). Second, in the CoDiP study, mother's extraversion negatively predicted the father's extraversion ($b = -.20$, 95% CI [-.35, -.05]). Third, in the CoDiP study, parental conscientiousness positively predicted offspring's later conscientiousness ($b = .11$, 95% CI [.03, .19]). With regard to interpersonal effects of self-

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES

24

esteem and later Big Five traits, the results suggest no significant longitudinal partner effects between family members.

Insert table 5 about here

Discussion

“All of our experiences fuse into our personality. Everything that ever happened to us is an ingredient.” - Malcolm X

To understand personality development, various ingredients have to be considered, including individual and social experiences. The aim of this study was to examine the actor and partner effects of personality development in parents and their adolescent and young adult offspring. We specifically focused on the person itself within which personality traits and self-esteem were supposed to impact each other, the romantic partner as important attachment figure, parents as caregivers, and the offspring as intergenerational tie.

Actor Effects between Personality Traits and Self-Esteem

The first aim of the current study consisted of analyzing the actor effects between Big Five traits and self-esteem and their concurrent and longitudinal effects. The results of our analyses with four family samples are in line with previous research (Amirazodi & Amirazodi, 2011; Campbell et al., 2002; Erdle et al., 2009; Robins, Tracy, et al., 2001) and corroborate personality traits as a descriptive system of the self to be related with self-esteem, the evaluative system of the self. The concurrent results showed that extraversion, agreeableness, conscientiousness, and openness were positively linked to self-esteem, whereas neuroticism was negatively associated with self-esteem with small to large effect sizes. Modest to large effects were most consistently found for neuroticism and extraversion highlighting the affective component of self-esteem (Francis & James, 1996; Swickert, Hittner, Kitos, & Cox-Fuenzalida, 2004). However, only results within the CFP study

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES

25

confirmed a significant correlation between conscientiousness and self-esteem in offspring. We can only speculate on why effects did not emerge in the other studies. The CFP study, in contrast to the FPP and CoDiP samples, was larger in size, resulting in more power to detect substantial effects. The results of the non-significant studies point to the same direction and may have been significant with a larger sample. However, the effect could also be explained by the age of the offspring. The CFP sample provided data of the youngest offspring of the present study, with children with an average age of 14 to 16 years. This could be a more sensitive period for conscientiousness to be related to self-esteem in adolescence.

The longitudinal analyses with three samples partly replicated the concurrent results and are in line with past research (Erol & Orth, 2011; Wagner et al., 2013). The CFP study in particular showed that higher extraversion, conscientiousness, openness, as well as lower neuroticism predicted higher self-esteem in parents two years later. For conscientiousness and neuroticism, the same results were found in the CoDiP and LSoG studies. Thus, in middle adulthood, personality traits linked to social interactions, agency, and emotional stability promote increases in self-esteem. These traits might be especially important during the period of middle adulthood where social roles have already been acquired and elaborated. Individuals equipped with matured personality traits, which enable them to fulfill social and work-related roles, seem to benefit with increased self-esteem in the long term. It has been suggested that personality maturation might be accompanied with social reinforcement, leading to increased general well-being (B. W. Roberts, Wood, & Smith, 2005; Specht, Egloff, & Schmukle, 2013). Our results lend support to these assumptions and extend them with regard to the functionality of a mature personality for personal well-being and self-esteem in particular (Soto, 2015; Specht et al., 2013).

In contrast to our theoretical explanation, agreeableness was not related to later self-esteem. This might be because agreeableness is not solely beneficial to one's own self-esteem. Individuals who believe in the good in people, who are forgiving, trust others easily, and are

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES

26

considerate of others, might be overrun in the workplace and social environment, especially if they lack a more dominant-extraverted side in their personality. Denissen et al. (2009) suggest that, “agreeable individuals should be more likely to ‘give in’ during conflict situations by either abstaining from efforts to control other people’s behavior or rebelling against rules and regulations” (p. 929). Although these effects might be beneficial in close relationships, in a competitive environment, such as the workplace, being agreeable might lead to frustration and disappointment, which might negatively affect a person’s self-esteem. Therefore, an interesting endeavor for future studies is to analyze whether agreeableness predicts self-esteem in middle adulthood if social dominance is also high. Such moderating effects would add to the comprehension of the processes linking Big Five traits to self-esteem.

Because openness to experience does increase during adolescence and stabilizes across adulthood (B. W. Roberts et al., 2006), it was puzzling that it was associated with later self-esteem increase in mid-adult parents (CFP) but not so in emerging adult offspring. During emerging adulthood offspring are still in the process of getting a degree or establish a role in the work place. Parents in their middle adulthood, in contrast, benefit from their former education and can explore new interests from a different economic and personal perspective, which might fuel their self-esteem.

In addition, our results point to an age-dependent positive influence of extraversion on self-esteem. More specifically, significant effects emerged in offspring aged between 22 to 38 years (CoDiP and LSoG) and parents aged about 45 years (CFP). Self-esteem of parents who were older (CoDiP and LSoG) and of offspring who were younger (CFP) did not change as a function of extraversion. These results may point to differential functional effects of extraversion for an individual’s self-esteem within a certain life phase. During young adulthood, developmental tasks involve finding a social group, selecting a romantic partner, starting a family, rearing children, and getting established in the work environment (Hutteman, Hennecke, Orth, Reitz, & Specht, 2014). Thus, through the establishment of these

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES

27

new relationships the individual experiences social acceptance, which entails increases in self-esteem (Leary & Baumeister, 2000). However, developmental tasks change in middle and late adulthood (Hutteman et al., 2014), when most crucial relationships are generally established and the task involves sustaining these relationships rather than initiating new ones. It would be insightful to differentiate extraversion into its two facets of social dominance and social vitality (B. W. Roberts et al., 2006) to investigate their differential impact on self-esteem.

With regard to a reciprocal association, we examined whether self-esteem predicts later Big Five traits. Within parents and offspring, the results suggest that self-esteem predicts decreases in neuroticism, and increases in extraversion and openness. The associations between self-esteem and neuroticism were most predominantly replicated in all studies. Further, in parents, self-esteem also contributed to later increases in agreeableness and conscientiousness. Our results are novel to personality research insofar that they underline the relevance of self-esteem for later personality trait development. Especially in the case of neuroticism, but also for extraversion, conscientiousness, and openness, the current evidence indicates that broad dispositions and characteristic adaptations, such as self-esteem, impact each other in a reciprocal way across the life span.

An explanation for the predictive effect of self-esteem on Big Five trait change can be found in the egosystem motivation literature. Self-esteem reflects a psychological resource that enables a person to pursue long-term goals. Because individuals with low self-esteem are constantly concerned with being a person of value and preoccupied with their impression on other people, self-esteem regulation and impression management might stand in the way of pursuing long-term goals (Crocker, Moeller, & Burson, 2010). Personality trait development can be instrumental in achieving goals (Hennecke, Bleidorn, Denissen, & Wood, 2014) and therefore, individuals with higher self-esteem could be able to change their traits in the desired direction to be able to achieve their goals in contrast to individuals with low self-

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES

28

esteem, who are caught up in the short-term task of regulating their self-esteem (Crocker et al., 2010).

In conclusion, our results challenge the assumption of unidirectionality in the association between Big Five traits and self-esteem, as postulated in the five-factor theory of personality (McCrae & Costa, 1999). Rather, in line with McAdams and Pals (2006), our results speak for the acknowledgment of Big Five traits as broad dispositions and self-esteem as a characteristic adaptation to be connected in a bidirectional manner.

Personality Codevelopment in Parental Couples

The second aim of the current study was to analyze whether concurrent and longitudinal effects would emerge between partners' Big Five traits and self-esteem. The cross-sectional associations between parental partners' Big Five traits and self-esteem yielded two substantial results. First, if the female partner was neurotic, the male partner tended to have lower self-esteem, which could be explained by the demand/withdraw cycle which tends to happen more in partners higher in neuroticism (Caughlin & Vangelisti, 2000) with women being more likely to hold a demanding role (Christensen & Heavey, 1990).

Second, if one partner was extraverted, the other partner reported higher self-esteem. However, the longitudinal results do not reveal an effect of one partner's extraversion on the other partner's self-esteem or vice versa. From a contemporaneous perspective, extraversion and self-esteem between partners might be related because a person's self-esteem might serve as a secure haven for the partner from which he or she explores social connections and feel positive affect. In addition, the partner's extraversion could convey greater social acceptance, which according to sociometer theory (Leary & Baumeister, 2000), can enhance self-esteem

Longitudinal codevelopment in personality within parental couples yielded little evidence with the exception of extraversion and agreeableness. First, the female partner's higher extraversion level predicted lower extraversion levels in the male partner two years later. These results could hint to complementary processes, where the female partner's

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES

29

extraversion level predicts to what extent the male partner changes in a contrasting direction. An explanation could include that partners balance home responsibilities and social involvement within the same household. If the wife is strongly oriented to meeting people and being sociable, the father is more introverted whereas if the wife is more introverted, the couple has more resources for the husband to engage in the social realms. Future research needs to further illuminate the partner effects in extraversion between parental couples.

Second, having an agreeable partner predicted increases in one's own agreeableness later. Previous results suggest that sharing environmental experiences fosters similarity in couples across time (Caspi et al., 1992). Because the parents in the CFP study are exposed to at least one child in their teenage years and with adolescence being a challenging time for parents, this might demand more agreeableness on the side of the parents because of their shared role. In addition, in terms of the self-expansion theory (E. N. Aron & Aron, 1996) partners might include each other in their self and incorporate their characteristics. Thus, in the case of agreeableness, partners might have initially been motivated to self-expand into the direction of increased agreeableness, maybe due to new circumstances, such as parenting an adolescent child. Within the close relationship with their partner, they incorporate the partner's traits and thus increase in that regard. Because the partner incorporates one's ideal self, movement toward that ideal is facilitated (Rusbult et al., 2009). However, different processes could be at play, necessitating further investigation in the future to provide research with a more fine-grained picture of how romantic partners impact each other's personality over time. With regard to previous research, Humbad et al. (2010), for instance, found no convergence effects in a large sample of couples, with the exception of aggression, which was assessed as a subfacet of the negative emotionality trait. This subfacet overlaps with the Big Five trait agreeableness, demonstrating a large negative association (Church, 1994). Thus, in a sense, our findings are in line with their results showing that only in agreeableness

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES

30

convergence effects emerge. This result seems relevant because of its interpersonal longitudinal nature and the positive impact one partner exerts on the other partner.

In conclusion, within parental couples in middle adulthood codevelopment regarding Big Five traits and self-esteem was weak. This might be due to two reasons. First, during middle adulthood, parental couples have already shared much mutual time and many experiences; hence the partner might be less influential in later relationship stages as opposed to earlier ones. Because the environment of a long-lasting romantic relationship is rather stable, it might also lead to stabilizing one's own personality rather than change (Asendorpf & van Aken, 2003). It would be insightful to examine freshly dating or newlywed couples (Gonzaga, Carter, & Buckwalter, 2010). Second, the level of assessment in Big Five traits and self-esteem might be too broad when investigating codevelopment in personality (Mund & Neyer, 2014). Future studies might find more nuanced results when investigating not only traits but also their subordinate facets (Mund & Neyer, 2014) and domain-specific self-esteem (Elfhag et al., 2010). Finally, in addition to the romantic context, other social relationships for instance at work might impact personality trait and self-esteem development more strongly during middle adulthood.

Personality Codevelopment in Parents and Their Offspring

The third aim of our study related to intergenerational codevelopment in personality. More specifically, we investigated whether parents and their offspring's personality traits and self-esteem were linked concurrently and over time. With regard to the effects from parents to their offspring, our results demonstrate both parents' conscientiousness predicted increases in the child's conscientiousness over time (CoDiP study). The emerging adult children were at time point 2 on average 22 years old. At this age, young adults in Switzerland strive for a college degree or to establish themselves in the workplace. Evidence demonstrates that during emerging adulthood personality matures, especially when following a life path of vocational training (Lüdtke, Roberts, Trautwein, & Nagy, 2011). During these life phases, young adults

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES

31

might look up to their parents who have finished their education and are established in their respective fields. This might influence them to be more conscientious over time. However, a positive correlation also means that if parents are less conscientious, the young adult child would benefit less. The parenting style, the parent-child relationship and parental role modeling might explain how parental conscientiousness could foster conscientiousness in the young adult child.

In addition, children's personality also predicted parents' self-esteem. The concurrent results indicate that offspring agreeableness and mother's self-esteem were positively associated and the longitudinal models suggest that the child's agreeableness predicts later increases in father's self-esteem (in the CFP sample). These two results speak for the importance of the adolescent child's agreeableness for parental self-esteem development. Benevolence is known to be closely tied to agreeableness and has been found in children during the transition to adolescence to be related to the father's sense of competence three years later (Egberts, Prinzie, Dekovic, de Haan, & van den Akker, 2015). Fathers of agreeable children feel more competent when handling difficult situations, coping with everyday demands, and controlling the child's behavior. Thus, the adolescent child's agreeableness might foster self-esteem in fathers by increasing their feelings of competence when coping with a teenage child, especially during the time when conflict frequency between parents and children peaks (Damian, Su, Shanahan, Trautwein, & Roberts, 2014).

In sum, the current study suggests not only that parental conscientiousness is relevant for the child's self-esteem and conscientiousness, but also that the offspring's agreeableness plays a role in parents' self-esteem. In most cases, however, we did not find substantial influence of parents on their children or vice versa, probably for several reasons. First, intergenerational codevelopment in personality and the genetic effects of personality are moderated by the relationship perception of adolescents (Krueger, South, Johnson, & Iacono, 2008). During adolescence the relationship with parents is often characterized by conflict

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES

32

situations (Shanahan, McHale, Osgood, & Crouter, 2007). Likewise, during adolescence and adulthood individuals often experience ambivalence towards close family members (Fingerman, Hay, & Birditt, 2004; Tighe, Birditt, & Antonucci, 2016). Hence, future research needs to tap into the parent-offspring relationship to further investigate the mutual influence that parents and offspring exert on each other. Second, during adolescence relationships outside the family, such as with peers and romantic partners, gain importance (Collins, 2003; Maxwell, 2002). Therefore, parental effects on personality change in their offspring might be less crucial during adolescence and especially young adulthood (Wrzus & Neyer, *in press*). The study of Schofield et al. (2012) found that parents' personality predicted their child's personality within two years. However, the children were in 10th grade at time point 1. This speaks for the further examination of the developmental windows within which the parental personality impacts the child's personality. Third, and as already mentioned above, the abstraction level of Big Five traits and global self-esteem might be too broad to measure specific effects in intergenerational codevelopment in personality.

Strengths and Limitations

The current study has several strengths underlying the contribution of the results at hand, including the use of four family studies from three nations to corroborate the findings and examine age-related effects. Further, we analyzed the data with triadic APIMs to examine actor and partner effects within and between generations and to simultaneously control for the interdependence of data within the same family (Kenny, Kashy, & Cook, 2006; Ledermann et al., *in press*). Finally, our study examined concurrent and longitudinal associations of Big Five traits and self-esteem. In doing so, we were able to analyze whether Big Five traits only impacted self-esteem or whether a bidirectional association exists. Also, from an interpersonal perspective, our longitudinal models controlling for the stability of the dependent variable gave us some indication of how traits and self-esteem predict change in personality two or three years later.

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES

33

Despite these strengths, at least three limitations are worth mentioning. First, due to the limited sample sizes, we were not able to employ multiple-group analysis to investigate differential effects for female and male offspring or siblings. However, we have controlled for the offspring's sex to present unaffected results. Research shows that parental differential treatment of sons and daughters affects self-esteem in offspring (McHale, Updegraff, Jackson-Newsom, Tucker, & Crouter, 2000). In addition, the influence of the familial environment is likely to differ among offspring and its impact might be explained through the children's differential interpretation and response to familial influence (Hoffman, 1991). Thus, future research might include gender and birth order of the offspring to clarify possible differential effects.

Second, our analyses were solely based on self-reports. The FPP study additionally provides other-report data for family members and the CoDiP study provides partner-perceived personality reports in couples. Because not all family studies offered other-reported data we refrained from reporting effects of single studies. With respect to methodological improvements, future research could benefit from a multi-informant approach, especially in the perception of personality development during adolescence. During this time, research demonstrates differences between offspring's and maternal perception of the child's personality development (Van den Akker et al., 2014). In addition, recent research also shows that agreement in the perception of the child's personality of children and their parents fosters self-esteem development in the child (Luan et al., in press).

Third, the current study did not test moderating or mediating factors such as parenting, parent-offspring relationship quality or relationship duration of parents. Further, we only investigated parental couples that are in established relationships in a certain life phase; including a wider age and relationship duration span could uncover differential effects within romantic relationships. Such and other moderating and mediating variables could shed more light on codevelopment in personality between family members. The TESSERA framework

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES

34

postulates how repeated situations and the elicited states can fuel personality development (Wrzus & Roberts, 2016). Our study was a first step to examine the familial impact on personality development. However, future studies need to test the specific sequences of the TESSERA framework with regard to the family context. Moreover, we did not control for potential social desirability rating tendencies of participants. The association between Big Five traits and self-esteem seems to be affected by social desirable ratings, especially in the case of agreeableness and openness to experience (Robins, Tracy, et al., 2001). Another moderating factor could be the culture of the sample. The current studies have been conducted in Western countries; however, research shows that, for instance, extraversion may be more valued in Western in contrast to Eastern countries (Francis & James, 1996). Finally, assessing personality traits and self-esteem on a facet and domain-specific level (Elfhag et al., 2010; Mund & Neyer, 2014) could illustrate more accurately how parental couples and parents and their offspring codevelop in their personality. Hence, these limitations need to be addressed in future studies.

Conclusion

The present research suggests three main findings. First, family member's Big Five traits and self-esteem impact each other reciprocally over time. More specifically, neuroticism, conscientiousness, extraversion, and openness predict higher self-esteem, whereas self-esteem predicts change in all five traits over time. Second, parental couple's personality traits were only associated with respect to extraversion and self-esteem concurrently, and with extraversion and agreeableness over time. Third, parental impact on their offspring was evident for conscientiousness, whereas offspring's agreeableness predicted parental self-esteem. This research is an initial step toward illuminating how family members' personality traits and self-esteem are interwoven within each person, but also between family members.

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES

35

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PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES

46

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PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES

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48

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49

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PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES

51

Footnotes

¹ We are aware that in family studies, genetic and shared environmental effects commingle. However, it is not the goal of the current study to unravel the influence of family members in its separate components, but rather to give a holistic picture of codevelopment in phenotypic personality between family members.

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES

Table 1
Overview of the Sample and Instruments of the Four Family Studies

	CFP	FPP	CoDiP	LSoG
Project Name	California Families Project	Family and Personality Project	Co-Development in Personality	Longitudinal Study of Generations
Country	USA, hispanic	Netherlands	Switzerland	USA
T1	2008	1997	2010	1988
Years between T1 and T2	2	cross-sectional	2	3
N _{families}	401	285	201	203
age father	43.3	46.0	53.2	61.7
M age mother	40.8	43.7	50.4	59.3
M age offspring	14.2	16.6	20.0	35.5
female offspring	50.4%	49.5%	58.2%	54.8%
Personality measure	BFI ($\alpha = .68 - .80$)	30-item questionnaire ($\alpha = .72 - .90$)	BFI ($\alpha = .69 - .89$)	Eysenck E/N Scale ($\alpha = .75 - .87$)
Self-esteem measure	Rosenberg ($\alpha = .77 - .87$)	Rosenberg ($\alpha = .83 - .89$)	Rosenberg ($\alpha = .87 - .89$)	Rosenberg ($\alpha = .78 - .85$)

Notes. CFP = California Families Project (USA); FPP = Family and Personality Project (NL); CoDiP = Co-Development in Personality Study (CH); LSoG = Longitudinal Study of Generations (USA).

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES

Table 2

Cross-Sectional Actor Effects of Family APIMs with Big Five Traits Predicting Self-Esteem at T1

		Extraversion		Agreeableness		Conscientiousness		Neuroticism		Openness	
		<i>b</i>	95% CI	<i>b</i>	95% CI	<i>b</i>	95% CI	<i>b</i>	95% CI	<i>b</i>	95% CI
Fathers	CFP	.48	[.42, .55]	.50	[.44, .56]	.57	[.51, .63]	-.52	[-.58, -.46]	.45	[.38, .51]
	FPP	.40	[.32, .47]	.36	[.28, .43]	.15	[.07, .24]	-.48	[-.55, -.40]	.26	[.18, .34]
	CoDiP	.45	[.35, .55]	.23	[.12, .33]	.36	[.26, .47]	-.48	[-.58, -.39]	.24	[.14, .35]
	LSoG	.30	[.20, .40]					-.33	[-.48, -.18]		
Mothers	CFP	.48	[.42, .55]	.50	[.44, .56]	.57	[.51, .63]	-.52	[-.58, -.46]	.45	[.38, .51]
	FPP	.40	[.32, .47]	.36	[.28, .43]	.15	[.07, .24]	-.48	[-.55, -.40]	.26	[.18, .34]
	CoDiP	.45	[.35, .55]	.23	[.12, .33]	.36	[.26, .47]	-.48	[-.58, -.39]	.24	[.14, .35]
	LSoG	.30	[.20, .40]					-.57	[-.69, -.45]		
Offspring	CFP	.27	[.18, .36]	.48	[.40, .57]	.45	[.37, .54]	-.49	[-.58, -.41]	.32	[.23, .41]
	FPP	.33	[.22, .44]	.39	[.28, .50]	.14	[.02, .26]	-.50	[-.60, -.40]	.19	[.08, .31]
	CoDiP	.28	[.14, .42]	.25	[.11, .38]	.14	[-.01, .28]	-.57	[-.70, -.44]	.14	[.00, .28]
	LSoG	.22	[.09, .36]					-.47	[-.59, -.35]		

Notes. Unstandardized regression coefficients are displayed with offspring's gender as control variable. Due to the

variable standardization, the *b*-coefficients can be interpreted as standardized β -coefficients. CFP = California Families

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES

Table 3

Longitudinal Actor Effects of Family APIMs with Big Five Traits at T1 Predicting Self-Esteem at T2

		Extraversion		Agreeableness		Conscientiousness		Neuroticism		Openness	
		<i>b</i>	95% CI	<i>b</i>	95% CI	<i>b</i>	95% CI	<i>b</i>	95% CI	<i>b</i>	95% CI
Father	CFP	.13	[.06, .20]	.05	[-.02, .12]	.12	[.05, .20]	-.16	[-.23, -.09]	.18	[.12, .25]
	CoDiP	.04	[-.05, .14]	.03	[-.07, .14]	.13	[.03, .23]	-.15	[-.24, -.05]	.04	[-.06, .13]
	LSoG	-.01	[-.10, .07]					-.10	[-.19, -.01]		
Mother	CFP	.13	[.06, .20]	.05	[-.02, .12]	.12	[.05, .20]	-.16	[-.23, -.09]	.18	[.12, .25]
	CoDiP	.04	[-.05, .14]	.03	[-.07, .14]	.13	[.03, .23]	-.15	[-.24, -.05]	.04	[-.06, .13]
	LSoG	-.01	[-.10, .07]					-.10	[-.19, -.01]		
Offspring	CFP	.06	[-.03, .15]	.10	[.01, .20]	.11	[.02, .21]	-.23	[-.33, -.13]	-.03	[-.12, .06]
	CoDiP	.16	[.03, .29]	-.06	[-.20, .09]	.01	[-.13, .15]	-.03	[-.20, .15]	-.06	[-.19, .07]
	LSoG	.19	[.07, .30]					-.01	[-.14, .13]		

Notes. Unstandardized regression coefficients are displayed with offspring's gender as control variable. Due to the

variable standardization, the *b*-coefficients can be interpreted as standardized β -coefficients. CFP = California Families

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES

Table 4

Longitudinal Actor Effects of Family APIMs with Self-Esteem at T1 Predicting Big Five Traits at T2

		Extraversion		Agreeableness		Conscientiousness		Neuroticism		Openness	
		<i>b</i>	95% CI	<i>b</i>	95% CI	<i>b</i>	95% CI	<i>b</i>	95% CI	<i>b</i>	95% CI
Father	CFP	.09	[.03, .15]	.21	[.14, .28]	.21	[.15, .28]	-.14	[-.21, -.08]	.13	[.06, .19]
	CoDiP	-.05	[-.14, .04]	.05	[-.05, .14]	.08	[-.02, .18]	-.17	[-.27, -.08]	-.04	[-.11, .04]
	LSoG	.10	[.03, .18]					-.29	[-.37, -.21]		
Mother	CFP	.09	[.03, .15]	.21	[.14, .28]	.21	[.15, .28]	-.14	[-.21, -.08]	.13	[.06, .19]
	CoDiP	-.05	[-.14, .04]	.05	[-.05, .14]	.08	[-.02, .18]	-.17	[-.27, -.08]	-.04	[-.11, .04]
	LSoG	.10	[.03, .18]					-.29	[-.37, -.21]		
Offspring	CFP	.13	[.05, .21]	.04	[-.06, .13]	.07	[-.03, .16]	-.16	[-.26, -.07]	.01	[-.08, .09]
	CoDiP	-.01	[-.11, .09]	.05	[-.07, .16]	.00	[-.12, .11]	-.11	[-.26, .04]	.22	[.12, .32]
	LSoG	.04	[-.06, .14]					-.17	[-.29, -.06]		

Notes. Unstandardized regression coefficients are displayed with offspring's gender as control variable. Due to the variable standardization, the *b*-coefficients can be interpreted as standardized β -coefficients. CFP = California Families Project (USA); FPP = Family and Personality Project (NL); CoDiP = Co-Development in Personality Study (CH); LSoG = Longitudinal Study of Generations (USA)

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES

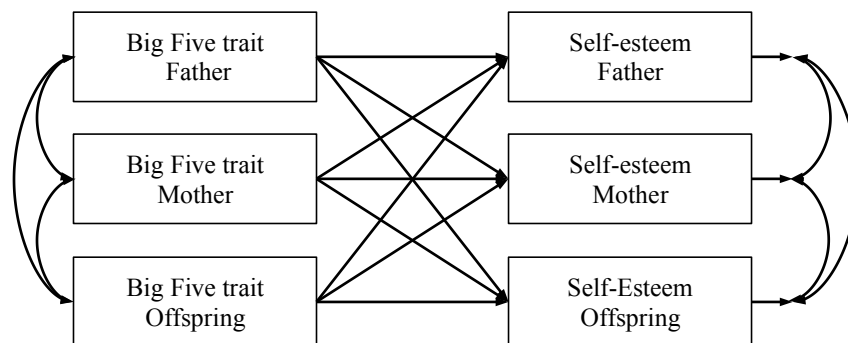


Figure 1. Cross-sectional three-person APIM with a Big Five trait predicting self-esteem.

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES

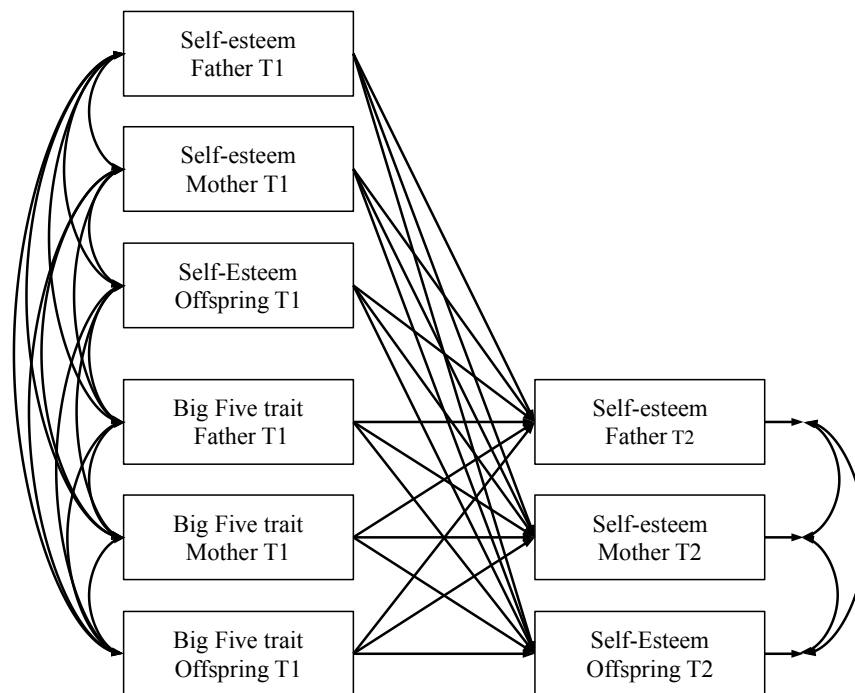


Figure 2. Longitudinal triadic APIM with a Big Five trait predicting self-esteem. The second model included self-esteem predicting a Big Five trait, controlling for the stability of the Big Five trait.

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES: SUPPLEMENTAL MATERIAL

Table 1
Intrapersonal Bivariate Correlations Within Family Members Across Variables.

	CFP																	
	Fathers						Mothers						Offspring					
	E	A	C	N	O	SE	E	A	C	N	O	SE	E	A	C	N	O	SE
Extraversion	.69**	.57**	.57**	-.57**	.54**	.55**	.72**	.42**	.55**	-.48**	.54**	.44**	.62**	.37**	.40**	-.36**	.35**	.36**
Agreeableness	.52**	.47**	.63**	-.63**	.54**	.60**	.41**	.60**	.65**	-.51**	.45**	.61**	.29**	.54**	.49**	-.44**	.38**	.40**
Conscientiousness	.50**	.58**	.58**	-.52**	.55**	.62**	.53**	.59**	.65**	-.57**	.60**	.64**	.25**	.57**	.52**	-.45**	.21**	.49**
Neuroticism	-.52**	-.52**	-.51**	.64**	-.40**	-.58**	-.47**	-.49**	-.50**	.69**	-.38**	-.59**	-.21**	-.51**	-.53**	.49**	-.21**	-.56**
Openness	.44**	.47**	.50**	-.32**	.52**	.53**	.56**	.44**	.60**	-.39**	.68**	.52**	.39**	.42**	.30**	-.22**	.57**	.26**
Self-Esteem	.54**	.50**	.59**	-.53**	.43**	.53**	.41**	.50**	.55**	-.53**	.47**	.63**	.28**	.48**	.46**	-.50**	.33**	.49**

	FPP																	
	Fathers						Mothers						Offspring					
	E	A	C	N	O	SE	E	A	C	N	O	SE	E	A	C	N	O	SE
Extraversion																		
Agreeableness	.41**						.25**						.31**					
Conscientiousness	.18**	.38**					.05	.28**					.02	.24**				
Neuroticism	-.35**	-.23**	-.05				-.39**	-.18**	-.05				-.37**	-.24**	-.11			
Openness	.25**	.36**	.15**	-.07			.23**	.33**	.13*	-.13*			.25**	.29**	.04	-.15**		
Self-Esteem	.43**	.40**	.17**	-.46**	.26**		.38**	.33**	.15*	-.51**	.26**		.34**	.37**	.12*	-.53**	.20**	

Notes: Bivariate correlations at T1 are below the diagonal, at T2 above the diagonal. Stabilities between constructs are shown on the diagonal. E = extraversion, A = agreeableness, C = conscientiousness, N = neuroticism, O = openness, SE = self-esteem.

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES: SUPPLEMENTAL MATERIAL

Table 1 continued

	CoDiP																	
	Fathers						Mothers						Offspring					
	E	A	C	N	O	SE	E	A	C	N	O	SE	E	A	C	N	O	SE
Extraversion	.79**	.07	.25*	.02	.32**	.28**	.84**	.14	.29**	-.42**	.26**	.44**	.83**	.15	.17	-.32**	.18*	.36**
Agreeableness	.12	.76**	.31**	-.37**	.17	.40**	.11	.74**	.33**	-.43**	.23*	.22*	.15*	.75**	.19*	-.13	.04	.16
Conscientiousness	.29**	.22**	.73**	-.25*	.27**	.46**	.41**	.28**	.79**	-.43**	.23*	.38**	.02	.09	.76**	-.05	.06	.13
Neuroticism	-.16	-.27**	-.27**	.79**	.21*	-.45**	-.49**	-.34**	-.43**	.75**	-.18	-.63**	-.24**	-.20**	-.05	.70**	-.11	-.53**
Openness	.40*	.09	.11	.07	.83**	.28**	.33**	.17*	.16*	-.08	.83**	.21*	.12	.11	.07	-.04	.78**	.21*
Self-Esteem	.43**	.32**	.39**	-.40**	.26**	.74**	.49**	.16*	.34**	-.57**	.23**	.76**	.28**	.23**	.12	-.58**	.13	.65**
LSoG																		
Fathers						Mothers						Offspring						
E	A	C	N	O	SE	E	A	C	N	O	SE	E	A	C	N	O	SE	
Extraversion	.67**		-.29**		.26**	.74**		-.29**		.31**		.73**		-.22**		.41**		
Neuroticism	-.12		.57**		-.60**	-.25**		.71**		-.67**		-.22**		.64**		-.57**		
Self-Esteem	.33**		-.40**		.54**	.28**		-.55**		.62**		.24**		-.48**		.59**		

Notes. Bivariate correlations at T1 are below the diagonal, at T2 above the diagonal. Stabilities between constructs are shown on the diagonal.

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES: SUPPLEMENTAL MATERIAL

Table 2
Model Fits for Cross-Sectional Family APIMs

	CFP			FPP			CoDiP		LSoG	
	df	CFI		df	CFI		df	CFI	df	CFI
	χ^2	TLI		χ^2	TLI		χ^2	TLI	χ^2	TLI
	<i>p</i> -value	RMSE		<i>p</i> -value	RMSE		<i>p</i> -value	RMSE	<i>p</i> -value	RMSE
	A	A		A	A		A	A	A	A
Extraversion	4	1.00		4	1.00		4	1.00	3	.99
	4.80	.99		.76	1.00		.93	1.00	3.34	.97
	.31	.02		.94	.00		.92	.00	.34	.02
Agreeableness	2	1.00		4	.99		2	1.00		
	1.04	1.00		4.96	.97		1.82	1.00		
	.59	.00		.29	.03		.40	.00		
Conscientiousness	4	1.00		4	1.00		4	.99		
	.68	1.00		2.55	1.00		4.45	.98		
	.95	.00		.64	.00		.35	.02		
Neuroticism	4	1.00		4	1.00		4	1.00	1	1.00
	1.23	1.00		.92	1.00		3.78	1.00	.00	1.00
	.87	.00		.92	.00		.44	.00	.96	.00
Openness	4	1.00		3	.99		4	1.00		
	2.1	1.00		3.28	.98		2.15	1.00		
	.72	.00		.35	.02		.71	.00		

Notes. Paths that could not be set equal: In the CFP model with agreeableness, the paths from both parents to the offspring and from the offspring to both parents; in the FPP model with openness and the LSoG model with extraversion, the paths from the offspring to both parents; in the LSoG model with neuroticism, actor and partner effects between parents, the paths from the offspring to both parents.

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES: SUPPLEMENTAL MATERIAL

Table 3

Model Fits for Longitudinal Family APIMs with Big Five Traits Predicting Self-Esteem

	CFP			CoDiP			LSoG		
	df	CFI		df	CFI		df	CFI	
	χ^2	TLI		χ^2	TLI		χ^2	TLI	
	<i>p</i> -value	RMSE		<i>p</i> -value	RMSE		<i>p</i> -value	RMSE	
		A			A			A	
Extraversion	8	1.00		8	1.00		8	1.00	
	7.82	1.00		1.97	1.00		3.94	1.00	
	.45	.00		.98	.00		.86	.00	
Agreeableness	7	.99		8	1.00				
	11.25	.97		4.05	1.00				
	.13	.04		.85	.00				
Conscientiousness	8	1.00		8	1.00				
	8.47	1.00		2.49	1.00				
	.39	.01		.96	.00				
Neuroticism	8	1.00		8	1.00		8	1.00	
	9.14	.99		5.02	1.00		.81	1.00	
	.33	.02		.76	.00		1.00	.00	
Openness	8	.99		8	1.00				
	11.08	.98		5.87	1.00				
	.20	.03		.66	.00				

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES: SUPPLEMENTAL MATERIAL

Table 4

Model Fits for Longitudinal Family APIMs with Self-Esteem Predicting Big Five Traits

	CFP		CoDiP		LSoG	
	df	CFI	df	CFI	df	CFI
	χ^2	TLI	χ^2	TLI	χ^2	TLI
	<i>p</i> -value	RMSEA	<i>p</i> -value	RMSEA	<i>p</i> -value	RMSEA
Extraversion	8	1.00	6	.99	8	1.00
	3.98	1.00	10.48	.96	6.36	1.00
	.86	.00	.11	.06	.61	.00
Agreeableness	8	.98	8	1.00		
	14.73	.95	8.03	1.00		
	.07	.05	.43	.00		
Conscientiousness	8	1.00	8	.99		
	8.24	1.00	12.57	.96		
	.41	.01	.13	.03		
Neuroticism	8	1.00	8	.99	8	1.00
	4.78	1.00	11.11	.97	8.74	.99
	.78	.00	.20	.04	.37	.02
Openness	7	.99	8	1.00		
	14.85	.95	9.87	.99		
	.04	.05	.27	.03		

Notes. In the CFP model with openness, we could not set the paths from both parents to the offspring equal. In the CoDiP model with extraversion, we could not set both partner effects in the parental couple members equal. We examined the significant χ^2 test of the CFP model with openness the test of small difference in fit, which was not significant ($df_{unconstrained}=0$, $df_{constrained}=7$, critical $\Delta\chi^2=27.3$, observed $\Delta\chi^2=14.9$, *ns*).

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES: SUPPLEMENTAL MATERIAL

Table 5

Cross-Sectional Partner Effects of Family APIMs with Big Five Traits Predicting Self-Esteem at T1 Within Parents

		Extraversion		Agreeableness		Conscientiousness		Neuroticism		Openness	
		<i>b</i>	95% CI	<i>b</i>	95% CI	<i>b</i>	95% CI	<i>b</i>	95% CI	<i>b</i>	95% CI
F → M	CFP	.11	[.05, .18]	.02	[-.04, .09]	.07	[.01, .13]	-.07	[-.14, -.01]	.09	[.02, .15]
	FPP	.09	[.01, .17]	.03	[-.05, .11]	.02	[-.07, .10]	-.04	[-.11, .04]	.06	[-.02, .14]
	CoDiP	.14	[.03, .25]	-.16	[-.32, .01]	-.03	[-.14, .09]	-.09	[-.20, .02]	.02	[-.10, .15]
	LSoG	-.03	[-.15, .10]					.09	[-.08, .27]		
M → F	CFP	.11	[.05, .18]	.02	[-.04, .09]	.07	[.01, .13]	-.07	[-.14, -.01]	.09	[.02, .15]
	FPP	.09	[.01, .17]	.03	[-.05, .11]	.02	[-.07, .10]	-.04	[-.11, .04]	.06	[-.02, .14]
	CoDiP	.14	[.03, .25]	.12	[-.04, .29]	-.03	[-.14, .09]	-.09	[-.20, .02]	.02	[-.10, .15]
	LSoG	-.03	[-.15, .10]					-.18	[-.35, -.004]		

Notes. Unstandardized regression coefficients are displayed with offspring's gender as control variable. Due to the variable standardization, the *b*-coefficients can be interpreted as standardized β -coefficients. Coefficients in bold are significant ($p < .01$). F → M = Father's self-esteem predicting mother's Big Five traits. M → F = Mother's self-esteem predicting father's Big Five traits.

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES: SUPPLEMENTAL MATERIAL

Table 6
Cross-Sectional Partner Effects of Family APIMs with Big Five Traits Predicting Self-Esteem at T1 Across Generations

		Extraversion		Agreeableness		Conscientiousness		Neuroticism		Openness	
		<i>b</i>	95% CI	<i>b</i>	95% CI	<i>b</i>	95% CI	<i>b</i>	95% CI	<i>b</i>	95% CI
F → O	CFP	.03	[-.04, .11]	.12	[-.02, .21]	.05	[-.01, .12]	-.01	[-.11, .10]	.04	[-.03, .11]
	FPP	.02	[-.05, .10]	.03	[-.04, .10]	.01	[-.08, .09]	-.05	[-.12, .02]	.00	[-.08, .08]
	CoDiP	.04	[-.06, .14]	-.04	[-.20, .13]	.09	[-.01, .19]	.00	[-.11, .10]	.04	[-.06, .13]
	LSoG	.05	[-.04, .14]					-.02	[-.11, .07]		
M → O	CFP	.03	[-.04, .11]	-.07	[-.15, .02]	.05	[-.01, .12]	-.01	[-.11, .10]	.04	[-.03, .11]
	FPP	.02	[-.05, .10]	.03	[-.04, .10]	.01	[-.08, .09]	-.05	[-.12, .02]	.00	[-.08, .08]
	CoDiP	.04	[-.06, .14]	.16	[-.01, .31]	.09	[-.01, .19]	.00	[-.11, .10]	.04	[-.06, .13]
	LSoG	.05	[-.04, .14]					-.02	[-.11, .07]		
O → F	CFP	-.01	[-.08, .06]	-.05	[-.15, .04]	-.01	[-.07, .06]	-.03	[-.09, .04]	.02	[-.05, .08]
	FPP	.04	[-.04, .12]	.08	[-.002, .15]	.04	[-.04, .13]	-.07	[-.14, .01]	.11	[-.001, .22]
	CoDiP	-.03	[-.13, .08]	.06	[-.06, .18]	.01	[-.11, .13]	-.09	[-.20, .02]	-.06	[-.18, .06]
	LSoG	.18	[-.001, .36]					-.15	[-.32, .02]		
O → M	CFP	-.01	[-.08, .06]	.12	[-.04, .20]	-.01	[-.07, .06]	-.03	[-.09, .04]	.02	[-.05, .08]
	FPP	.04	[-.04, .12]	.08	[-.002, .15]	.04	[-.04, .13]	-.07	[-.14, .01]	-.02	[-.13, .10]
	CoDiP	-.03	[-.13, .08]	.06	[-.06, .18]	.01	[-.11, .13]	-.09	[-.20, .02]	-.06	[-.18, .06]
	LSoG	-.02	[-.16, .11]					.01	[-.11, .13]		

Notes. Unstandardized regression coefficients are displayed with offspring's gender as control variable. Due to the variable standardization, the *b*-coefficients can be interpreted as standardized β -coefficients. Coefficients in bold are significant ($p < .01$). F → O = Father's Big Five traits predicting offspring's self-esteem. M → O = Mothers' Big Five traits predicting offspring's self-esteem. O → F = Offspring's Big Five traits predicting fathers' self-esteem. O → M = Offspring's Big Five traits predicting mothers' self-esteem.

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES: SUPPLEMENTAL MATERIAL

Table 7

Longitudinal Partner Effects of Family APIM with Self-Esteem at T1 Predicting Self-Esteem at T2 Within Parents

		Extraversion		Agreeableness		Conscientiousness		Neuroticism		Openness	
		<i>b</i>	95% CI	<i>b</i>	95% CI	<i>b</i>	95% CI	<i>b</i>	95% CI	<i>b</i>	95% CI
M ↑ F	CFP	.02	[-.05, .09]	-.02	[-.10, .05]	.01	[-.07, .08]	.00	[-.08, .07]	-.02	[-.09, .05]
	CoDiP	.04	[-.08, .16]	.04	[-.07, .14]	.07	[-.04, .18]	.05	[-.06, .16]	.01	[-.09, .12]
	LSoG	.06	[-.04, .16]					.00	[-.11, .11]		
F ↑ M	CFP	.02	[-.05, .09]	-.02	[-.10, .05]	.01	[-.07, .08]	.00	[-.08, .07]	-.02	[-.09, .05]
	CoDiP	.04	[-.08, .16]	.04	[-.07, .14]	.07	[-.04, .18]	.05	[-.06, .16]	.01	[-.09, .12]
	LSoG	.06	[-.04, .16]					.00	[-.11, .11]		

Notes. Unstandardized regression coefficients are displayed with offspring's gender as control variable. Due to the variable standardization, the *b*-coefficients can be interpreted as standardized β -coefficients. Coefficients in bold are significant ($p < .01$). F → M = Father's self-esteem predicting mother's Big Five traits. M → F = Mother's self-esteem predicting father's Big Five traits.

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES: SUPPLEMENTAL MATERIAL

Table 8
Longitudinal Partner Effects of Family APIM with Self-Esteem at T1 Predicting Self-Esteem at T2 Across Generations

		Extraversion		Agreeableness		Conscientiousness		Neuroticism		Openness	
		<i>b</i>	95% CI	<i>b</i>	95% CI	<i>b</i>	95% CI	<i>b</i>	95% CI	<i>b</i>	95% CI
F → O	CFP	.06	[-.01, .13]	.05	[-.02, .11]	.05	[-.03, .12]	.04	[-.03, .12]	.06	[-.01, .13]
	CoDiP	.09	[-.01, .19]	.09	[-.01, .18]	.10	[-.01, .18]	.11	[-.01, .21]	.08	[-.004, .17]
	LSoG	-.06	[-.15, .03]					-.10	[-.21, .002]		
M → O	CFP	.06	[-.01, .13]	.05	[-.02, .11]	.05	[-.03, .12]	.04	[-.03, .12]	.06	[-.01, .13]
	CoDiP	.09	[-.01, .19]	.09	[-.01, .18]	.10	[-.01, .18]	.11	[-.01, .21]	.08	[-.004, .17]
	LSoG	-.06	[-.15, .03]					-.10	[-.21, .002]		
O → F	CFP	.01	[-.05, .08]	-.01	[-.06, .08]	.01	[-.07, .08]	.01	[-.07, .08]	.02	[-.04, .09]
	CoDiP	.02	[-.07, .11]	.02	[-.06, .11]	.02	[-.06, .10]	.09	[-.01, .19]	.03	[-.05, .11]
	LSoG	.03	[-.07, .13]					-.02	[-.12, .08]		
O → M	CFP	.01	[-.05, .08]	-.01	[-.06, .08]	.01	[-.07, .08]	.01	[-.07, .08]	.02	[-.04, .09]
	CoDiP	.02	[-.07, .11]	.02	[-.06, .11]	.02	[-.06, .10]	.09	[-.01, .19]	.03	[-.05, .11]
	LSoG	.03	[-.07, .13]					-.02	[-.12, .08]		

Notes. Unstandardized regression coefficients are displayed with offspring's gender as control variable. Due to the variable standardization, the *b*-coefficients can be interpreted as standardized β -coefficients. Coefficients in bold are significant ($p < .01$). F → O = Father's Big Five traits predicting offspring's self-esteem. M → O = Mothers' Big Five traits predicting offspring's self-esteem. O → F = Offspring's Big Five traits predicting fathers' self-esteem. O → M = Offspring's Big Five traits predicting mothers' self-esteem.

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES: SUPPLEMENTAL MATERIAL

Table 9

Interpersonal Longitudinal Results of Family APIM with Big Five Traits at T1 Predicting Self-Esteem at T2 within Parents

		Extraversion		Agreeableness		Conscientiousness		Neuroticism		Openness	
		<i>b</i>	95% CI	<i>b</i>	95% CI	<i>b</i>	95% CI	<i>b</i>	95% CI	<i>b</i>	95% CI
$F \rightarrow M$	CFP	-.06	[-.13, .02]	.02	[-.05, .09]	-.03	[-.10, .05]	.02	[-.05, .09]	.03	[-.04, .09]
	CoDiP	.00	[-.12, .11]	.04	[-.08, .15]	-.03	[-.14, .08]	-.06	[-.17, .05]	.10	[-.01, .21]
	LSoG	-.01	[-.11, .09]					-.09	[-.20, .01]		
$M \rightarrow F$	CFP	-.06	[-.13, .02]	.02	[-.05, .09]	-.03	[-.10, .05]	.02	[-.05, .09]	.03	[-.04, .09]
	CoDiP	.00	[-.12, .11]	.04	[-.08, .15]	-.03	[-.14, .08]	-.06	[-.17, .05]	.10	[-.01, .21]
	LSoG	-.01	[-.11, .09]					-.09	[-.20, .01]		

Notes. Unstandardized regression coefficients are displayed with offspring's gender as control variable. Due to the variable standardization, the *b*-coefficients can be interpreted as standardized β -coefficients. Coefficients in bold are significant ($p < .01$). $F \rightarrow M$ = Father's self-esteem predicting mother's Big Five traits. $M \rightarrow F$ = Mother's self-esteem predicting father's Big Five traits.

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES: SUPPLEMENTAL MATERIAL

Table 10
Longitudinal Partner Effects of Family APIMs with Big Five Traits at T1 Predicting Self-Esteem at T2 across Generations

		Extraversion		Agreeableness		Conscientiousness		Neuroticism		Openness	
		<i>b</i>	95% CI	<i>b</i>	95% CI	<i>b</i>	95% CI	<i>b</i>	95% CI	<i>b</i>	95% CI
F → O	CFP	-.01	[-.09, .07]	.03	[-.04, .10]	.02	[-.06, .10]	-.02	[-.10, .05]	.00	[-.08, .07]
	CoDiP	.00	[-.11, .11]	.03	[-.06, .12]	.00	[-.10, .10]	.04	[-.08, .16]	.03	[-.06, .12]
	LSoG	.08	[.001, .17]					-.14	[-.24, -.03]		
M → O	CFP	-.01	[-.09, .07]	.03	[-.04, .10]	.02	[-.06, .10]	-.02	[-.10, .05]	.00	[-.08, .07]
	CoDiP	.00	[-.11, .11]	.03	[-.06, .12]	.00	[-.10, .10]	.04	[-.08, .16]	.03	[-.06, .12]
	LSoG	.08	[.001, .17]					-.14	[-.24, -.03]		
O → F	CFP	.02	[-.05, .08]	.16	[.06, .26]	.02	[-.05, .09]	-.03	[-.10, .04]	-.02	[-.09, .04]
	CoDiP	.02	[-.07, .11]	-.02	[-.12, .07]	-.08	[-.17, .02]	.14	[.02, .25]	-.03	[-.12, .06]
	LSoG	-.01	[-.11, .09]					-.09	[-.19, .01]		
O → M	CFP	.02	[-.05, .08]	.01	[-.08, .09]	.02	[-.05, .09]	-.03	[-.10, .04]	-.02	[-.09, .04]
	CoDiP	.02	[-.07, .11]	-.02	[-.12, .07]	-.08	[-.17, .02]	.14	[.02, .25]	-.03	[-.12, .06]
	LSoG	-.01	[-.11, .09]					-.09	[-.19, .01]		

Notes. Unstandardized regression coefficients are displayed with offspring's gender as control variable. Due to the variable standardization, the *b*-coefficients can be interpreted as standardized β -coefficients. Coefficients in bold are significant ($p < .01$). F → O = Father's Big Five traits predicting offspring's self-esteem. M → O = Mothers' Big Five traits predicting offspring's self-esteem. O → F = Offspring's Big Five traits predicting fathers' self-esteem. O → M = Offspring's Big Five traits predicting mothers' self-esteem.

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES: SUPPLEMENTAL MATERIAL

Table 11
Longitudinal Partner Effects of Family APIMs with Big Five Traits at T1 Predicting Big Five Traits at T2 within Parents

		Extraversion		Agreeableness		Conscientiousness		Neuroticism		Openness	
		<i>b</i>	95% CI	<i>b</i>	95% CI	<i>b</i>	95% CI	<i>b</i>	95% CI	<i>b</i>	95% CI
F → M	CFP	-.06	[-.12, .01]	.12	[.04, .19]	.05	[-.02, .12]	.01	[-.06, .08]	.03	[-.04, .09]
	CoDiP	.03	[-.12, .18]	.03	[-.09, .14]	.07	[-.03, .17]	.04	[-.07, .15]	-.07	[-.17, .02]
	LSoG	-.02	[-.11, .07]					-.14	[-.24, -.03]		
M → F	CFP	-.06	[-.12, .01]	.12	[.04, .19]	.05	[-.02, .12]	.01	[-.06, .08]	.03	[-.04, .09]
	CoDiP	-.20	[-.35, -.05]	.03	[-.09, .14]	.07	[-.03, .17]	.04	[-.07, .15]	-.07	[-.17, .02]
	LSoG	-.02	[-.11, .07]					-.14	[-.24, -.03]		

Notes. Unstandardized regression coefficients are displayed with offspring's gender as control variable. Due to the variable standardization, the *b*-coefficients can be interpreted as standardized β -coefficients. Coefficients in bold are significant ($p < .01$). F → M = Father's self-esteem predicting mother's Big Five traits. M → F = Mother's self-esteem

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES: SUPPLEMENTAL MATERIAL

Table 12

Longitudinal Partner Effects of Family APIMs with Big Five Traits at T1 Predicting Big Five traits at T2 across Generations

		Extraversion		Agreeableness		Conscientiousness		Neuroticism		Openness	
		<i>b</i>	95% CI	<i>b</i>	95% CI	<i>b</i>	95% CI	<i>b</i>	95% CI	<i>b</i>	95% CI
F → O	CFP	.04	[-.03, .11]	.05	[-.02, .11]	.02	[-.06, .09]	.06	[-.01, .13]	.01	[-.06, .07]
	CoDiP	.04	[-.05, .12]	.01	[-.07, .08]	.11	[-.03, .19]	.04	[-.07, .15]	.04	[-.02, .11]
	LSoG	.08	[.01, .14]					-.01	[-.11, .09]		
M → O	CFP	.04	[-.03, .11]	.05	[-.02, .11]	.02	[-.06, .09]	.06	[-.01, .13]	.01	[-.06, .07]
	CoDiP	.04	[-.05, .12]	.01	[-.07, .08]	.11	[-.03, .19]	.04	[-.07, .15]	.04	[-.02, .11]
	LSoG	.08	[.01, .14]					-.01	[-.11, .09]		
O → F	CFP	.04	[-.01, .10]	.00	[-.07, .07]	.05	[-.02, .11]	.02	[-.04, .09]	.01	[-.05, .07]
	CoDiP	.08	[-.002, .16]	-.02	[-.12, .08]	.05	[-.05, .15]	-.03	[-.16, .09]	.04	[-.05, .13]
	LSoG	.04	[-.05, .12]					.08	[-.01, .17]		
O → M	CFP	.04	[-.01, .10]	.00	[-.07, .07]	.05	[-.02, .11]	.02	[-.04, .09]	.01	[-.05, .07]
	CoDiP	.08	[-.002, .16]	-.02	[-.12, .08]	.05	[-.05, .15]	-.03	[-.16, .09]	.04	[-.05, .13]
	LSoG	.04	[-.05, .12]					.08	[-.01, .17]		

Notes. Unstandardized regression coefficients are displayed with offspring's gender as control variable. Due to the variable standardization, the *b*-coefficients can be interpreted as standardized β -coefficients. Coefficients in bold are significant ($p < .01$). F → O = Father's Big Five traits predicting offspring's self-esteem. M → O = Mothers' Big Five traits predicting offspring's self-esteem. O → F = Offspring's Big Five traits predicting fathers' self-esteem. O → M =

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES: SUPPLEMENTAL MATERIAL

Table 13

Longitudinal Partner Effects of Family APIMs with Self-Esteem at T1 Predicting Big Five Traits at T2 within Parents

		Extraversion		Agreeableness		Conscientiousness		Neuroticism		Openness	
		<i>b</i>	95% CI	<i>b</i>	95% CI	<i>b</i>	95% CI	<i>b</i>	95% CI	<i>b</i>	95% CI
$\begin{matrix} \text{M} \\ \uparrow \\ \text{F} \end{matrix}$	CFP	.01	[-.06, .07]	-.07	[-.15, .004]	-.02	[-.09, .06]	.05	[-.02, .12]	.05	[-.02, .12]
	CoDiP	-.10	[-.25, .05]	.01	[-.09, .12]	.02	[-.08, .13]	.01	[-.09, .12]	-.01	[-.10, .08]
	LSoG	.02	[-.08, .11]					.06	[-.05, .17]		
$\begin{matrix} \text{F} \\ \uparrow \\ \text{M} \end{matrix}$	CFP	.01	[-.06, .07]	-.07	[-.15, .004]	-.02	[-.09, .06]	.05	[-.02, .12]	.05	[-.02, .12]
	CoDiP	.12	[-.03, .27]	.01	[-.09, .12]	.02	[-.08, .13]	.01	[-.09, .12]	-.01	[-.10, .08]
	LSoG	.02	[-.08, .11]					.06	[-.05, .17]		

Notes. Unstandardized regression coefficients are displayed with offspring's gender as control variable. Due to the variable standardization, the *b*-coefficients can be interpreted as standardized β -coefficients. Coefficients in bold are significant ($p < .01$). $\text{F} \rightarrow \text{M}$ = Father's self-esteem predicting mother's Big Five traits. $\text{M} \rightarrow \text{F}$ = Mother's self-esteem predicting father's Big Five traits.

PERSONALITY TRAITS AND SELF-ESTEEM IN FAMILIES: SUPPLEMENTAL MATERIAL

Table 14
Longitudinal Partner Effects of Family APIM with Self-Esteem at T1 Predicting Big Five Traits at T2 across Generations

		Extraversion		Agreeableness		Conscientiousness		Neuroticism		Openness	
		<i>b</i>	95% CI	<i>b</i>	95% CI	<i>b</i>	95% CI	<i>b</i>	95% CI	<i>b</i>	95% CI
F → O	CFP	.06	[-.003, .12]	.04	[-.02, .11]	.04	[-.03, .11]	.00	[-.07, .07]	-.03	[-.12, .07]
	CoDiP	-.01	[-.08, .07]	-.03	[-.10, .04]	-.04	[-.11, .04]	-.08	[-.18, .01]	.01	[-.06, .07]
	LSoG	.02	[-.05, .09]					-.07	[-.16, .02]		
M → O	CFP	.06	[-.003, .12]	.04	[-.02, .11]	.04	[-.03, .11]	.00	[-.07, .07]	.09	[.004, .18]
	CoDiP	-.01	[-.08, .07]	-.03	[-.10, .04]	-.04	[-.11, .04]	-.08	[-.18, .01]	.01	[-.06, .07]
	LSoG	.02	[-.05, .09]					-.07	[-.16, .02]		
O → F	CFP	.03	[-.02, .09]	.01	[-.06, .08]	.00	[-.06, .07]	-.03	[-.09, .04]	-.01	[-.07, .05]
	CoDiP	-.01	[-.09, .07]	.05	[-.04, .15]	-.02	[-.11, .06]	-.02	[-.13, .09]	.02	[-.06, .10]
	LSoG	-.04	[-.12, .05]					.01	[-.08, .10]		
O → M	CFP	.03	[-.02, .09]	.01	[-.06, .08]	.00	[-.06, .07]	-.03	[-.09, .04]	-.01	[-.07, .05]
	CoDiP	-.01	[-.09, .07]	.05	[-.04, .15]	-.02	[-.11, .06]	-.02	[-.13, .09]	.02	[-.06, .10]
	LSoG	-.04	[-.12, .05]					.01	[-.08, .10]		

Notes. Unstandardized regression coefficients are displayed with offspring's gender as control variable. Due to the variable standardization, the *b*-coefficients can be interpreted as standardized β -coefficients. Coefficients in bold are significant ($p < .01$). F → O = Father's Big Five traits predicting offspring's self-esteem. M → O = Mothers' Big Five traits predicting offspring's self-esteem. O → F = Offspring's Big Five traits predicting fathers' self-esteem. O → M = Offspring's Big Five traits predicting mothers' self-esteem.

APPENDIX F: Selbständigkeitserklärung

Ich erkläre hiermit, dass ich die Dissertation mit dem Titel *Codevelopment in Personality: The Interplay Between Big Five Traits, Self-Esteem, and Satisfaction in Couples and Families* selbständig verfasst und keine anderen als die angegebenen Quellen benutzt habe.

Alle Stellen, die wörtlich oder sinngemäss aus Quellen entnommen wurden, habe ich als solche gekennzeichnet. Die zur Promotion eingereichten Zeitschriftenbeiträge wurden in Zusammenarbeit mit den jeweiligen Koautorinnen und Koautoren angefertigt.

Basel, _____

Rebekka Weidmann

APPENDIX E: Curriculum Vitae

Name	Rebekka Weidmann
Nationality	Swiss (Ramlinsburg, BL)
Date of Birth	November 15, 1987

Higher education

2013 – 2016	Research assistant and doctoral student at the Department of Psychology, Division of Developmental and Personality Psychology, University of Basel, Switzerland
2011 – 2013	Master of Science in Psychology, Major in Personality and Developmental Psychology, University of Basel, Switzerland
2007 – 2011	Bachelor of Science in Psychology, University of Basel, Switzerland

School education

2003 – 2006	Gymnasium, Liestal, Switzerland
1999 – 2003	Secondary School, Gelterkinden, Switzerland
1994 – 1999	Primary School, Gelterkinden, Switzerland

Internships

2010	Schulpsychologischer Dienst, Liestal, Switzerland
2010	Klinik für Psychiatrie und Psychotherapie, Liestal, Switzerland